THE RUBBER AGE AND TIRE NEWS

JUNE 25, 1919 VOL. V. NO. 6

Member of the Associated Business Papers, Inc.

INDEX TO CONTENTS

The Analysis of Antimony Pentasulphide..... 239
An Improved Crude Rubber Bale Cutting Machine.. 241
Information Exchange 241
Deresination of Crude Rubber..... 242
Properties of Elderberry Seed Rubber..... 245
Development of the Goodyear Export Organization.. 246
Balata in Hard Rubber..... 247
Personal Notes of the Rubber Trade..... 248
News of the Rubber Metropolis..... 249
Building Activities in the Industry..... 250

TIRE NEWS:
Application of Pneumatic Motor Truck Tires..... 251
Financial Notes of the Tire Industry..... 252
Personal Notes of the Tire Trade..... 253
American Rubber Patents..... 254

MARKETS:
Manufactured Rubber Goods..... 255
Cotton, Yarns and Fabric..... 255
Chemicals and Compounding Materials..... 256
Crude Rubber 257
Scrap Rubber 257

THE GARDNER-MOFFAT COMPANY, Inc., *Publisher*
HARTFORD BUILDING, UNION SQUARE
22 EAST 17th STREET, NEW YORK

SUBSCRIPTION PRICE: TWO DOLLARS PER YEAR, SINGLE COPIES TEN CENTS. CANADA: TWO DOLLARS AND A HALF A YEAR. FOREIGN: THREE DOLLARS A YEAR.

COPYRIGHT, 1919, BY THE GARDNER-MOFFAT COMPANY, INC., PUBLISHERS.
ISSUED ON THE TENTH AND TWENTY-FIFTH OF EACH MONTH. FORMS CLOSE FIVE DAYS PREVIOUSLY. ENTERED AS SECOND-CLASS MATTER MARCH 26, 1917, AT THE POST OFFICE AT NEW YORK, N. Y., UNDER THE ACT OF MARCH 3, 1897

TRENTON N.J., U.S.A. **ESSEX RUBBER COMPANY, Inc.** TRENTON N.J., U.S.A.

"ERCO" SOLES
"ESSEX" RUBBER HEELS
"TITE-EDGE" RUBBER HEELS
MOLDED SPECIALTIES

Trade Mark

AUTOMOBILE ACCESSORIES
INNER TUBES, CEMENTS, ETC.

MOLDED RUBBER GOODS

RED, ORANGE, YELLOW, BLUE, GREEN, VIOLET, BLACK, WHITE, ETC.

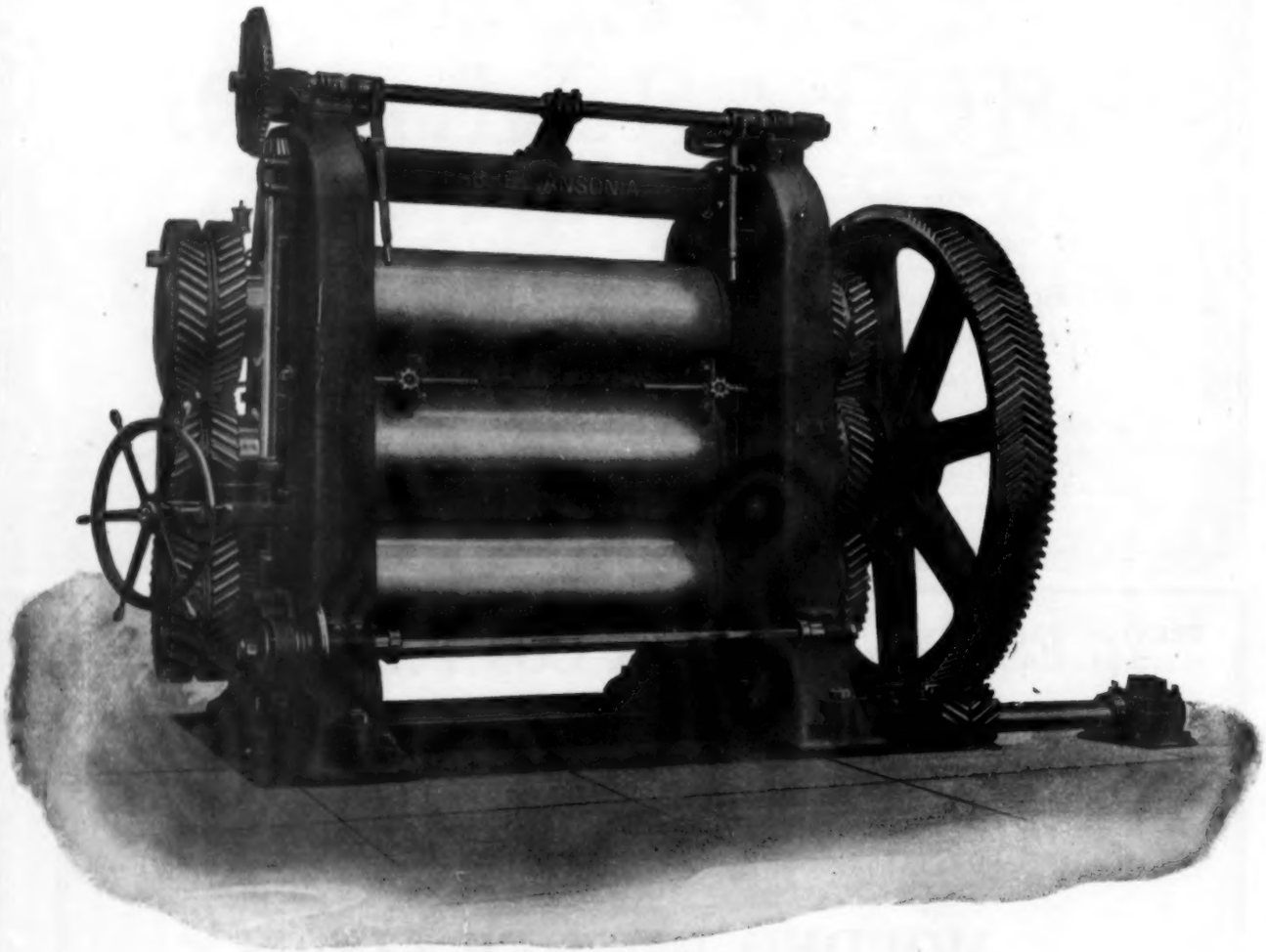
Brilliant and Strong **COLORS**

1890 L.H.B.CO.

Inert and Accelerating **FILLERS**

L. H. BUTCHER COMPANY, INCORPORATED
ESTABLISHED 1890
NEW YORK AKRON SEATTLE LOS ANGELES SAN FRANCISCO

FARREL
Rubber Machinery



We are Engineers and Builders of a Complete Line of

Washers, Mills, Calenders, Presses, etc.

SHAFTING *and* DRIVES

Special attention given to the making of cut double helical "noiseless" drives for mill and calender operation

Farrel Foundry & Machine Co.

ANSONIA, CONN., U. S. A.

Branch Office: 810 Union National Bank Building, Cleveland, Ohio.

L. D. GARDNER, PRESIDENT
W. D. MOFFAT, VICE-PRESIDENT
W. I. SEAMAN, TREASURER

THE RUBBER AGE AND TIRE NEWS

W. M. MILNER, EDITOR
H. M. WILLIAMS, GENERAL MANAGER
H. B. SEYMOUR, BUSINESS MANAGER

Vol. V | June 25, 1919 | No. 6

The Analysis of Antimony Pentasulphide

By D. Repony

The author tried out all standard methods of analyzing antimony pentasulphide without being able to obtain perfectly satisfactory results. He found that the known methods either involved too much work, or, worse still, did not satisfy the requirements of rubber manufacturers. The main feature of most methods is the determination of the total antimony content, a matter of no particular importance to the rubber manufacturer, whose chief concern in this connection is that the product should show a high percentage of antimony pentasulphide. It is altogether wrong, as far as the rubber manufacturer is concerned, to value antimony pentasulphide by its high content of antimony. A number of samples analyzed by the author showed a very high antimony content, but on closer examination it was found that more than 40 per cent was antimony tetraoxide, a white substance that is worthless as a coloring material and has no vulcanization accelerating power, a material which in antimony pentasulphide for this reason has no more value to the rubber manufacturer than would 40 per cent of whiting or any other cheap mineral filler. In fact, 40 per cent of whiting would in this case be of more value than the 40 per cent of antimony tetraoxide. The author, therefore, believes that he is justified in assuming that, basing its value on antimony, such a product cannot be sold for the same price as one containing 40 per cent of calcium sulphate.

The author has had occasion to analyze antimony from nearly every known manufacturer, both domestic and foreign, and has noted the surprising fact that practically every sample analyzed is found to be of a different composition, while on the other hand different lots from a same factory are generally found to be uniform in composition.

New Method of Analysis

The new method of analysis that will be described in the following paragraphs was developed by the author with a view to obtaining results that would be satisfactory from the point of view of the rubber manufacturer, and it is so devised that any partial information can be obtained with a minimum of work, while at the same time chemists who have sufficient time and proper facilities can make a complete analysis.

In the first place we must consider the chemical reaction by which most of the commercial antimony pentasulphide is produced.

The mineral stibnite is treated with sulphur and lime, and the product obtained is calcium thioantimonate, the latter being then decomposed by sulphuric acid into antimony pentasulphide and calcium sulphate. After this the antimony is washed with water to remove the remaining free acid and some portion of $CaSO_4$ that is soluble in water. A large quantity of the $CaSO_4$ remains in the product. On the other hand, however, when caustic soda is used in the reaction instead of lime, the antimony obtained is free from any sulphate provided the product has been thoroughly washed. Therefore, the presence of calcium sulphate must not be considered as a real adulterant, but merely as a by-product of the reaction.

However, calcium sulphate is not the best thing to be present in antimony, because it contains a high percentage of crystallization water, which during vulcanization is apt to cause "blowing." Seemingly, this fact has been recognized by at least one of the leading manufacturers of antimony pentasulphide who now produce an antimony containing barium sulphate, instead of calcium. Since barium sulphate is always free from water of crystallization, its presence in antimony in place of calcium sulphate is an important advantage as far as the rubber manufacturer is concerned.

Presence of Adulterants

The author has found all kinds of adulterants admixed to antimony, the ones most generally found being red oxide of iron; iron silicates, such as red clay. Whiting and other materials are also found to be used as adulterants. Therefore, it is very essential that rubber manufacturers should analyze for adulterants.

Too often do we hear rubber men say: "I should worry about the composition of antimony so long as we can obtain a nice color." Let us consider how far this supposition is correct. There is no question but that chemical analyses would be worthless if antimony did not prove satisfactory in practical use. But on the other hand, apparently satisfactory antimony does not always justify the price paid for it. To illustrate this point, the author will give a good example. One of the samples of antimony submitted to him, upon analysis showed over 30 per cent of a red clay powder, which had been mixed with the antimony as an adulterant. This antimony showed satisfactory color results after vulcanization, but six weeks later the color had changed very badly. In this case the manufacturer should not have to pay antimony prices for red clay for any experienced rubber compound man should be able to accomplish the same purpose at less cost.

The author, therefore, believes that every rubber factory should be informed of the antimony value of all the antimony it uses. At first thought the cost of analysis and physical examination may appear to be a costly proposition, yet in the end it is the cheapest course and should not be neglected by up-to-date rubber manufacturers.

Analysis

Before attempting to analyze a new antimony, rubber chemists should mix it in some of their most important rubber compounds, using it in the same proportions as the antimony previously used in the same compounds. The compounds thus made should be vulcanized at different vulcanizing temperatures.

If a compound does not change color during vulcanization at a heat of 310 degrees F., it can be safely assumed that the antimony will show good aging qualities. If the antimony changes color at 310 degrees F. or at lower vulcanizing temperatures, any further consideration depends much upon the price quoted and the quality of the rubber product in which the compound is to be used. In cheap compounds it is generally possible to duplicate the red color produced by inferior antimony with certain shades of red oxide of iron, especially in combination with other mineral fillers.

If the antimony sample gives satisfactory results in a rubber

compound subjected to vulcanization, the next thing is to determine whether or not it contains some adulterant. This can readily be done in the following simple manner:

Take 5 grams of the sample and place it in 100 cc. 10 per cent hot caustic soda solution and stir it with a glass rod on a steam bath until no more red particles can be observed. This is usually accomplished in about ten minutes. Pure antimony must pass completely in solution. Any red powder-like residue that remains indicates the presence of some adulterant like red oxide of iron or iron silicates. White residue in most cases indicates the presence of calcium sulphate, which can be readily determined by pouring the clear solution and the residue through filter paper and washing it with water until it passes completely into solution. If the residue is non-soluble in water it is either antimony tetraoxide or whiting, barites silica, or a similar material. Its exact nature can be determined by pushing further the analysis in the manner indicated further on, though it is seldom necessary to continue the analysis beyond the point of discovering that the antimony contains an adulterant.

Complete Analysis

In making a complete analysis of antimony pentasulphide, the following points should be borne in mind:

(1) Though good antimony should be bulky, with a specific gravity of from 2.50 to 2.75, the bulky appearance can be due to the use of an adulterant like magnesia carbonate (see point 5).

(2) Antimony should be neutral. Crimson antimonies, however, usually show a slightly acid reaction, though their acid content should in no case be higher than 1/100 of 1 per cent. The acidity is qualitatively determined by dampening a small portion of the samples with water and testing it with litmus paper. The quantitative amount of acid should be ascertained in the following manner:

Take two grams of the sample, place it in filter and wash it with water until washing water is neutral and titrate with 1/10 normal NaOH, using phenolphtaline as indicator.

Antimony containing more than 1/100 of 1 per cent of free acid should be rejected as it is apt to cause blisters during vulcanization, especially so in rubber compounds containing carbonates.

(3) Determination of free sulphur. Crimson antimony seldom contains any free sulphur. The amount of free sulphur in orange antimony ranges from 0 to 30 per cent, but the usual amount is between 15 and 20 per cent.

To determine the free sulphur, take 5 grams of the sample and enclose it in a thimble of filter paper in such a manner that the solvent during extraction cannot splash out any of the antimony, but can nevertheless readily penetrate the filter paper. Fresh redistilled carbon disulphide must be used as an extraction solvent, and the extraction should be continued for 10 hours. This should be done over night. Weber's statement that free sulphur cannot be determined by extraction with carbon disulphide because the antimony decomposes to a certain extent is completely wrong, and his supposition must be based on wrong observation due to the following facts.

For instance, when carbon disulphide that is not freshly distilled is used, it generally contains much free sulphur. Assuming that about 55 cc. of the solution are used for the extraction, the contents of free sulphur present in the carbon disulphide will in some cases amount to twice as much when compared with the free sulphur extracted from the antimony. Further, carbon disulphide will readily decompose under the influence of light, especially during boiling. The author has observed that during daylight extraction the result has been variable, and always higher than during night time extraction, which is very constant. For example, a crimson antimony which has been shown to be perfectly free of free sulphur by night time extraction with fresh redistilled CS_2 and has shown the same result on repeated extraction by night, has shown variable results by daylight extraction and as high as 4 per cent of free sulphur content. The writer has never been able to obtain satisfactory results by using the ammonia method described by Weber.

After the night extraction, the first thing in the morning, the carbon disulphide should be evaporated to dryness and the residue of free sulphur can be considered as the correct free sulphur content of the antimony thus treated. The extracted sample is dried at 60 degrees C. for an hour or more until all the carbon disulphide is volatilized. The total weight obtained is then noted and the sample preserved for further analysis.

Determination of Moisture

(4) The amount of moisture contained in antimony, like that contained in most mineral fillers, is usually very small. However, some antimonies contain as high as 15 per cent of water of crystallization. Indeed the amount of water of crystallization is always in proportion to the content of calcium sulphate. Since this water cannot readily be volatilized, six hours at a temperature of 100 degrees C. are required to completely eliminate it. When a vacuum is used considerably less time is required. But, due to the fact that during the long duration and higher temperature some of the free sulphur becomes volatilized it is difficult to obtain a final constant point of loss, therefore, for this purpose one must use the sample which has been obtained from the free sulphur extraction. For example, from the five grams, from which one gram of free sulphur has been extracted, and of which the antimony weighs 3.900 mg., take .7800 mg., which is equal to the original one gram, and place it on a watch glass of known weight and spread the sample over a large area. Then place it in a dryer at 100 degrees C. and weigh it occasionally till constant weight is obtained. If the result is .7400 mg., the contents of moisture and water of crystallization is 6 per cent.

(5) Determination of calcium sulphate, adulterants and antimony of other combination than antimony pentasulphide.

Since it seldom occurs that the atimony contains a number of different substances in the same sample, qualitative tests can be avoided and the sample directly quantitatively analyzed. However, since the calcium sulphate contents is the most frequent which has to be determined, and requires much time for quantitative determination, it is a good plan to take small amount of the original sample and shake it with water, filter off the solution and test it with a $BaCl_2$ solution. If no precipitation is obtained the antimony is ready for further investigation. If with $BaCl_2$ a precipitate is observed, then proceed as follows:

Take the equivalent of one gram of the sample which has resulted from the free sulphur determination, and place it on filter paper, wet it with a small quantity of alcohol and wash it with cold water. Use a glass funnel with a cock so that the washing water can pass very slowly and have enough time to act upon the calcium sulphate, after about 200 cc. water has been used up, take occasionally a few drops of the washing water dropping from the funnel and test it with a $BaCl_2$ solution and proceed with the washing till the water soluble calcium sulphate has passed completely in solution. Transfer the total washing water to weighed beaker and evaporate it on steam bath to dryness. Dry it at 100 degrees C. till constant weight is obtained. This residue represents dry calcium sulphate.

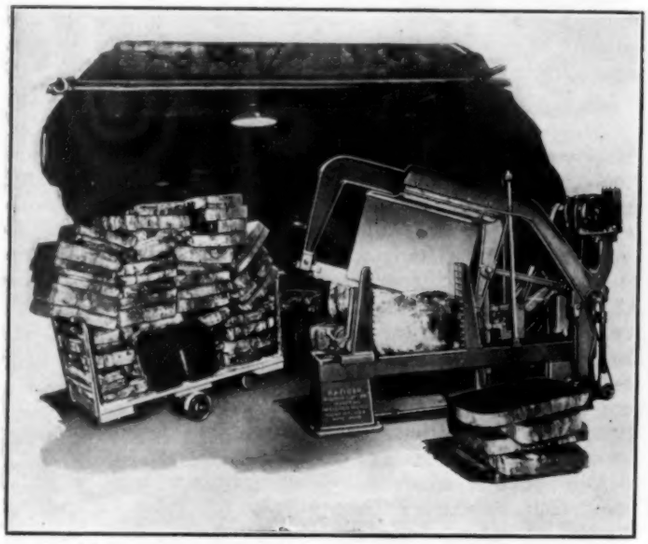
Take the antimony from which the calcium sulphate has been washed out, make a small hole in the bottom of the filter paper, and use water to wash the antimony down into beaker. Allow it to settle, then pour off the clear water and treat the antimony with about 100 cc. of 10 per cent caustic soda solution, keeping it for about ten minutes on steam bath and stirring it. Pass the antimony completely in solution. No further analysis in this group is required. If any residue is left, it rarely will represent a complex mixture of adulterants. In most cases it will represent only one kind of adulterant.

Allow the residue to settle, and pour off the clear solution, stir it up again with about 50 cc. water and transfer it to

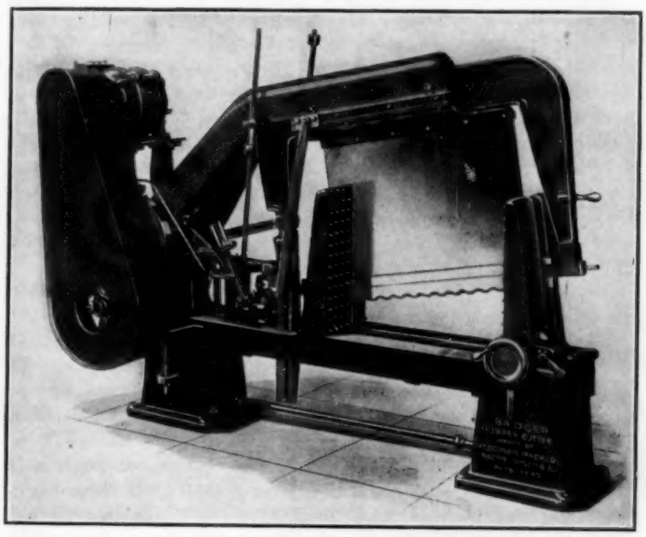
filter. There wash with water till the latter is of neutral reaction. Then take a weighed beaker and make a small hole in center and bottom of the filter paper, to wash the residue completely down with water. Allow it to settle and decant of the clear water. Evaporate the remaining water with the residue to dryness, and dry it till constant weight is obtained. This residue represents the total amount adulterant or antimony tetraoxide. A residue of red color indicates red oxide of iron or some iron silicate, and is the adulterant most frequently used. White residue represents barytes, antimony tetraoxide, whiting, magnesia carbonate or silicates. If it is of interest to learn the true composition of the residue, test it qualitatively in the usual way. In the whole course of analysis never use platinum crucibles as there is the danger to mistake the antimony tetraoxide for barytes or other mineral filler, and when the antimony tetraoxide is ignited with filter paper in a platinum crucible some of the antimony becomes reduced and will form alloy with the platinum.

An Improved Crude Rubber Bale Cutting Machine

The difficulty experienced in tearing apart and cutting up crude rubber is well-known to all rubber manufacturers, and the sight of three or four men spending ten to fifteen minutes tearing apart a bale of plantation crude with the aid of canthooks is a familiar sight in rubber factories, many of which have long been experimenting with more or less success on something to do this particular work.



CUTTING CRUDE RUBBER INTO SLABS



CLOSE-UP VIEW OF CRUDE RUBBER CUTTER

The practice of using power presses to bale rubber to save cargo space, which resulted from the scarcity of ocean tonnage during the war, and which will no doubt be continued because of the economy of from 20 to 30 per cent of shipping space that is obtained, has still further increased the difficulty of pulling apart plantation rubber bales.

A new machine called the "Peerless Rubber Cutter," built for cutting bales of crude rubber, such as smoked sheets, first latex, rolled and amber crêpe, into slices of desired thickness, has been placed on the market by the Peerless Machine Company, Racine, Wis., and is said to be a successful solution of the problem.

The Peerless cutter, which is shown in the accompanying photographs, has a capacity of 28 x 24 in. between its vises, which is sufficient to handle the largest bales of plantation rubber. It runs at a speed of 150 strokes a minute, and feeds down at the rate of one-quarter of an inch per stroke. One operator is said to be able to slice up a bale of crude rubber in four minutes.

This machine uses a sickle blade which reciprocates in a guide, while a thin film of water is evenly distributed to all points of the blade from inside the shield visible in the photographs.

The feed is positive, being operated by a ratchet and cam motion. The mechanism is such that if a hard foreign substance, such as wood or metal, should be encountered in the bale, a relief automatically applies and prevents any danger of breaking the machine. Either belt or motor drive can be used.

Neither compactness of bales nor gummy material offers resistance to this machine, with which, according to the makers, one man in a ten-hour day can cut from 125 to 150 bales of average size into slices of the average required thickness. This means a capacity of from 30,000 to 40,000 pounds of crude rubber per day.

While rigidly constructed, the Peerless cutter weighs only about 1500 lb. It occupies a floor space of about 8 by 3 ft.

Information Exchange

White Rubber Substitute

Inquiry No. 110.—We are in the marked for white rubber substitute and should appreciate your placing us in touch with manufacturers and dealers in this article.

Answer.—You can obtain rubber substitute from the following concerns: Edward B. Fulper, Trenton, N. J.; Tyson Brothers, Carteret, N. Y.; Carter Bell Manufacturing Company, New York City; Harshaw, Fuller & Goodwin Company, Cleveland, Ohio, Philadelphia, Pa., New York City and Chicago, Ill.; T. C. Ashley & Co., Atlantic Avenue, Boston, Mass.; Ernest Jacoby, Boston, Mass.; Corn Products Refining Company, New York City; William H. Scheel, New York City; Stamford Rubber Supply Company, Stamford, Conn.; Typke & King, Limited, Commonside East, Mitcham, England; Viscol Company, East Cambridge, Mass.

The Deresination of Crude Rubber

By Andrew H. King *

In previous papers the writer has pointed out that rubber may be represented by the chemical formula 2 $(C_{20} H_{16})$ n. The subscript n denotes that degree of polymerization on which depends, to a great extent, the value of the rubber, i. e., whether it is high- or low-grade. $C_{10} H_{16}$ is the basic formula for the whole terpene series to which rubber is very closely related, if not actually a member as was held by Weber. Many organic compounds, the terpenes in particular, possess the property of becoming resinified by oxidation in the air or under the influence of chemical reagents. In other words, they may be converted to substances very similar to the resins which occur in nature. The natural resins are solid, amorphous, and generally brittle masses, which break with a conchoidal fracture. They are insoluble in water and acids, but soluble in acetone, alcohol, ether, turpentine, etc. They are found in the solid form in abundance and occur also as balsams; that is, dissolved in terpenes or etherial oils from which they can be separated by steam distillation. Resins dissolve in alkalies to form resin soaps, but are precipitated when the solution is acidified. Most resins consist of a mixture of somewhat complicated acids, the so-called resin acids.

The resins of rubber are extremely complex, and are but very imperfectly understood. Neither their origin nor their composition is definitely known. The only way in which they can yet be safely defined is that they are substances which may be extracted from crude rubber by acetone or alcohol, and contain varying amounts of oxygen.

In regard to the relation of resins to rubber, only three views are possible:

(1) They are derivatives of rubber, oxidation products, etc.;

(2) They are terpene bodies of low polymerization;

(3) They were produced by the plant at the time of the formation of rubber, but by different reactions, and are not related chemically to rubber.

The first view, i. e., that they are derivatives of rubber, is the one most generally held, and is probably correct for high-grade rubbers, notably those obtained from Hevea brasiliensis. Tschirsch states that the carbon and hydrogen in resins frequently stand in the same relation to one another as in rubber, which, since all resins contain oxygen, would indicate that they are oxidation products. Perhaps the best argument, however, is that the resins of Hevea rubber protect it from oxidation and subsequent tackiness. When they are removed by extraction and the rubber sheeted out thin and exposed to air it quickly grows tacky. If it is again extracted it will be found to have regenerated its acetone soluble content. Oxidation is accelerated by ultraviolet light. If a thin sheet of rubber is exposed to air in the presence of ultraviolet light it becomes tacky and has a higher resin content than before exposure. This view is not concurred in by Hinrichsen and Marcusson, and probably will never be accepted as a general rule applying to all rubbers.

The second view is perhaps correct to a limited extent in all varieties of rubber. Probably when we understand the mechanism by which the plant produces caoutchouc we will be able to throw more light upon this theory. Many rubber resins, i. e., the acetone-soluble portion of rubber, are made up of two parts, a soft and a hard resin. These may often be separated by steam distillation, etc. The inference is that they are similar to the balsams which consist of a resin dissolved in an essential oil. The hard portion is likely an oxidation product of rubber similar to Spillers' resin. $C_{30}H_{48}O_{10}$ or a separate substance produced by the plant by some other reaction. The soft material is probably a terpene with a low degree of polymerization, i. e., $(C_{10}H_{16})$n where n is very small.

The third theory is applicable to the resins obtained from highly resinous rubbers, particularly those obtained from Dyera varieties such as Jelutong, Pontianac, Dead Borneo, etc. In these varieties the function of the plant seems mainly to have been the production of resin with rubber merely as a by-product. Hinrichsen and Marcusson attacked the question by investigating the optical properties of resins obtained from various rubbers. They found that all varieties examined except Hevea resin were optically active and dextro rotatory. They deresinated a sample of Funtumia rubber and exposed it to the air, bringing about oxidation and tackiness. On again deresinating they obtained 3.11 per cent. of an inactive resin. The rotation for natural Funtumia resin is [a] D+32.9. They concluded that since the oxygen derivative of rubber is optically inert this must be inert also and the active resins cannot possibly be rubber derivatives. Optical activity is a characteristic property of the terpenes, and the activity of natural resins is probably due to the presence of a small amount of such bodies.

Properties of Resins

Resin Content of Various Rubbers.—The percentage of resin varies with the variety of tree and the care with which the rubber has been prepared. In general the more careful the coagulation the lower the resin content. Table 1 contains the resin contents and washing losses of certain rubbers as given by Spence. Many others could be given, but these are perhaps the most important. It should be mentioned here that Guayule and Jelutong yields such a large quantity of resin and so little rubber that it was early abandoned, at least as a source of rubber. The resin is valuable for certain purposes, and odd lots still find their way to the market.

Ozonides of Resins.—Harries states that a characteristic property of rubber resins is that they form ozonides insoluble in carbon tetrachloride and chloroform.

Melting Point of Resins.—Most resins are liquid at ordinary temperatures. Ditmar reports the following melting points:

	Deg. C.
Congo Rubber	74
Borneo	92.5
Madagascar	102

Unsaponifiable Matter, Optical Activity and Iodine Values.—The work of Hinrichsen and Marcusson has been mentioned above. The values obtained by them are as follows:

	Unsaponifiable Matter in Resin.	Optical Rotation.	Iodine Value.
Jelutong	100%	(a) D + 50.9	30.6
Cassi	92.6	Active	....
Pedang	90.2	Active	....
Guayule	78.2	(a) D + 12	....
Kickixia	74.0	(a) D + 32.9	....
Congo	56.0	(a) D + 2	....
Ceylon	20.8	Inactive	....
Para	15.0	Inactive	118.0

They found as a general rule that the more active optically the resin the more unsaponifiable matter is contained. The unsaponifiable matter in Upper Congo resin gave a rotation of [a] D+24.5, while the saponifiable constituent of the same resin gave only [a] D + 13.

Characteristics of Certain Resins

Jelutong.—Dubosc treated crude Jelutong with acetone and then with ether and obtained two products, which after repeated crystallization were both shown to have the emperical formula $C_{30}H_{44}OH$. They differed as follows: Melting points 80°-82° and 105° C.; boiling points 195°-200° and 280°-290° C. respectively; also in their solubility in acetone and chloral, and in their behavior with nitric and sulphuric acids. Dubosc considers that there is simple relation between cholesterin and purified Jelutong resins. He regards the latter as isomers of phytosterin or plantcholesterin. Cholesterin gives a characteristic color reaction with propionic

* From *Chemical and Metallurgical Engineering.*

anhydride. A blue color is first obtained, which soon changes to red, then to green, then orange, and finally red. With acetic anhydride a violet color is obtained, which eventually turns black. The resin propionate has a melting point of 98°-100° C. Cholesterin propionate melts at 98° C. The resin acetate melts at 110 to 112° C. Cholesterin acetate melts at 113° C. The resin acetate, in common with cholesterin acetate, is saponifiable with boiling water. The reactions of cholesterin and Jelutong resin with sulphuric acid are analogous. Potassium permanganate, chromic acid, and sulphuric acid oxidize cholesterin to acids soluble in ammonia. Jelutong, when boiled three or four with one oxidizing mixture, is converted to cholesterin acid, which is easily separated by means of ammonia. Fractional extraction of Jelutong with acetone in a Soxhlet yields three distinct products, melting at 141° C., 115° C., and 103° C. A mixture of equal parts of the resins melts at 82° C. These bodies are isomers and have the emperical formula $C_{30}H_{50}O$.

Schidrowitz states that Jelutong contains a white crystalline hard resin soluble with difficulty in cold, but readily in hot absolute alcohol, and a soft yellowish resin very readily soluble in cold alcohol. Technically, hard resins are preferable to soft. A resin content up to 8 per cent. is not serious if it is mostly hard. Funtumia elastica, properly prepared, contains only hard resin. Schidrowitz is of the opinion that Jelutong resin is probably a compound of vegetable cholesterol with cinnamic acid.

The following analytical data was obtained by the writer on old Pontianac resin obtained in the open market.

	A.	B.	C.*
Melting point	73	82.0°	92.5° C.
Acid value	3.5	4.1	None
Saponification value	70.0	48.1	28.1
Iodine value	43.2	44.0	....
Acetone soluble	99.5	99.3	....

* Reported by Ditmar for Borneo.

Guayule.—The Guayule shrub, *Parthenum Argentatum*, contains 8 to 10 per cent. of rubber based on a dry material. The commercial rubber contains 75 per cent. of rubber hydrocarbons. The dry plant according to Alexander, yields about 6.5 per cent. of a dark-green substance when extracted with acetone. Of this 54 per cent., 31 per cent. and 15 per cent. are successively dissolved on treatment with light petroleum, ether and hot alcohol. Of the three component parts thus separated 12.1 per cent., 7 per cent. and 2 per cent. consist of unsaponifiable matter. The acids produced by the hydrolysis of the extract include one melting at 119° C., which belongs to the cinnamic acid group and phenyl acetic acid. Weil states that he found cinnamic acid in products of hydrolysis of Guayule resin. The crude acetone extract on steam distillation yields a sequiterpene alcohol melting at 127-128° C., which has a camphor-like odor.

On distillation with steam Guayule rubber yields from ½ to 4 per cent. of a volatile oil (15°/15° C .8861) which is laevorotary. You will note that Hinrichsen found the resin to be dextro-rotatory. This oil possesses a peculiar pepper-like aroma, and consists almost wholly of hydro-carbons. On distillation at 17 mm. pressure it yields the following fractions:

	Per Cent.
Between 50- 60 C.	30.0
60- 80 C.	20.3
120-160 C.	24.8
Resinous residue	5.

The first fraction is mainly 1-pinene and the third a sesquiterpene. No styrene is present. The above relates to the oil distilled from fresh Guayule. Oil distilled from plants which have been stored for several years contained much oxygenated material, and while pinene was obtained no sesquiterpene fraction could be isolated. The presence of volatile oil in Guayule is the cause of the difficulty experienced when the rubber was first used on an industrial scale, since it hinders vulcanization. The oil also causes trouble because of its dissolving action on rubber during vulcanization. It tends to break down the rubber and depolymerize it. Guayule can be used in small quantities blended with other rubbers, but if it is to be employed alone it should be deresinated.

The following analytical figures are the average of results obtained by the writer with fresh Guayule resin over a long period of time:

	Per Cent.
Iodine value	57.5
Saponification value	61.1
Acid value	20.5
Unsaponifiable	50.1

Function of Resins

In low-grade rubber the resin functions simply as a diluent. The rubber secured by deresination of Guayule, Pontianac, Jelutong, Palenbang, or Dead Borneo is in every case of good quality, being about on a par with Brown Crepe. In high-grade rubbers, such as the plantation and Para varieties derived from the Hevea brasiliensis tree, the function of the resin is entirely different. The first effect is to protect the crude rubber against oxidation. Deresinated Hevea rubber when exposed to the air soon becomes tacky. The second is to assist in vulcanization. Deresinated Hevea rubber cured with sulphur requires a longer time or higher sulphur content than is customary. The acetone soluble material from this variety of rubber is a good accelerator. The presence of resins is apparently necessary if the mineral accelerators are used. L. E. Weber was unable to obtain a good vulcanization with deresinated rubber, sulphur, and litharge. The presence or absence of resin has very little effect on the time of cure if organic accelerators are used. The accelerating effect of Hevea resin has now been shown to be due to nitrogenous matter which is soluble in acetone. The influence of proteins and other nitrogenous materials has been well discussed by Dubosc, Eaton and Grantham, Beadle and Stevens, and others, to whose writings the interested reader is referred.

Feasibility of Deresination

As indicated above, only low-grade rubbers were deresinated on a commercial scale; and of these only Guayule and the rubbers from Dyera costulata (namely: Jelutong, Pontianac, Palembang and Dead Borneo) ever came into any prominence in this field.

Chute in estimating the cost of deresinating Guayule in 1909 by his process, to be mentioned later, assumed that a grade yielding 60 per cent. of purified gum could be purchased at 30 cents per lb. He placed the solvent cost at 3 cents per lb. One lb. of Guayule would yield .6 lb. of gum at a cost of 36 cents, which made the cost per lb. of finished gum 60 cents. The market price of Guayule is still around 30 cents per lb., but of course solvents, particularly acetone, are much higher. On the other hand, however, chemical engineering practice has made great progress within the past nine years. With modern apparatus the solvent loss should be reduced almost to zero. Based on a process later to be discussed, using gasoline and acetone, the solvent loss was seldom less than 15 gallons of acetone, and 44 gallons of gasoline per 1,000 lb. of good rubber produced.

The supply of Pontianac is today almost exhausted. This is due solely to the wasteful and extremely primeval methods used by the natives in securing the gum. Where they might have tapped trees and built up a steady business they felled and bled them at many different points. The method produced quick results, but the procedure reminds one of the old fable about killing the goose that laid the golden egg. In 1909 a good grade of Ponti could be secured at 5 cents per lb. The market price is now around 30 cents per lb., making Ponti no longer a profitable purchase.

Chute in 1909 estimated the cost of deresinating Ponti as follows: "Assuming that Pontianac can be bought for 5 cents per lb., and that it yields one lb. of purified gum from ten lb. of the crude, then the materials cost (by his process) for the rubber will be 50 cents per lb. for the finished product. If one gallon of solvent per lb. of crude gum is used, and the solvent is worth 75 cents and the loss is one cent, then the cost for loss of chemicals calculated on the finished product would be 7.5 cents per lb. The cost for labor and other expenses for a moderate-sized factory should not exceed 5 cents per lb. of

finished product. This would give a total cost per lb. of 62.5 cents." Chute based his estimate on the use of certain methyl and ethyl esters, but the figures are typical of results obtained in the past.

The deresination of Ponti is now not to be thought of, but aside from patriotic reasons the treatment of Guayule should be a good business proposition. It is not nearly so difficult as the treatment of a low-grade gold ore. There is no reason why it cannot be successfully and profitably accomplished if suitable chemical engineering talent be obtained.

Statement of the problem:—

(1) To deresinate Guayule one must reduce the resin content from approximately 25 to about 2 per cent.

(2) The rubber must not suffer in quality by excessive heating or by detrimental action of any solvent or reagent.

(3) Solvent and rubber losses must be kept as low as possible.

(4) The operation must be accomplished in as short a time and with as few treatments as possible.

Processes: Many processes have been proposed in the past. They may all be classified under the following heads:

(1) Those which depend on the action of alkali on the resins.

(2) Those employing a mixed solvent which at high temperatures will dissolve rubber, but at lower temperatures is a better resin solvent.

(3) Those processes which use a rubber solvent for dissolving both rubber and resin, and then precipitate out the rubber by adding a resin solvent in which rubber is insoluble.

(4) Those which first extract the resin and later remove the rubber from woody material, such as occurs in Guayule, by a suitable rubber solvent.

(5) Those which employ a solvent for resin without at any time dissolving or otherwise affecting the rubber.

(6) Those which use a mixed solvent consisting of a rubber and a resin solvent. The first swells the rubber and the second removes the resin.

(1) *Alkali.*

Processes using alkali depend upon the fact that certain of the rubber resins are partly saponifiable. Guayule resin, as reported by Hinrichsen (see above), is about twenty-two per cent. saponifiable. Chaplet and Rousset state that washing rubber with alkali after deresination removed some albuminoids and oxydases which would otherwise turn it black and oxidize it. Treatment with alkaline solutions is not a practical proposition; first, because it removes only a small part of the resin; and second, the removal of all the alkali is almost impossible. Even traces of caustic behave as unregulated accelerators, causing the stock to harden up and surface check on standing.

However, the first deresinating patents granted in this country were to Austin Day, in 1856 for purifying rubber gums by treatment with alkaline solutions. In 1857 Robert Haerting received U. S. Patent No. 17,214 for purifying gutta percha by the action of an alkaline liquor which, as he claims, dissolves out the etheric oil. In 1903 W. A. Lawrence received a series of patents beginning with U. S. Patent No. 741,256 covering the extraction of rubber from plants (Guayule) by treatment first with naphtha and then with a solution of caustic soda. No. 741,258 issued August 20th, 1902, refers to a process by which the rubber is removed from the plants by mechanical means and the resins then dissolved by alkali or alcohol.

(2) Solvent which will dissolve rubber at high temperatures: This method is really much better suited to gutta-percha than to rubber. English Patent 22,758 was granted in 1901 to Combanaire and de la Fresnaye and covers the purification of gutta-percha by treatment with naphtha which at certain temperatures dissolves gutta resins. A similar patent was granted to Wilmonsky in 1901 for a process of refining gutta-percha, which consisted in dissolving the entire gum in hot gasoline and cooling to 60° F., when it was claimed if four gallons of naphtha or more were used for each pound of gum a flocculent precipitate was formed which consisted of pure gum.

Under this head may also be placed those processes which use pyridine. U. S. Patent 983,812, granted to Drefus, Friedl and Bentley in March, 1910, describes a process wherein crude rubber is treated with six times its weight of pyridine base oil (boiling between 130° and 220° C.) and an equal weight of water. The mixture is agitated and heated to about 100° C. under a reflux condenser for two to four hours. Owing to the fact that pyridine even at this temperature dissolves appreciable quantities of rubber, the process was never a commercial success.

(3) Dissolve both rubber and resin, then precipitate the latter:

In February, 1906, a German patent was granted to Gratz covering a process in which the crude rubber was treated with benzine, turpentine, carbon bisulphate or gasoline, which dissolves both rubber and resin. The rubber is precipitated by the addition of methyl, ethyl or amyl alcohol, which holds the resins in solution.

U. S. Patent 978,696, issued to L. H. Cahnut in June, 1910, describes the successive treatment of crude gum with carbon bisulphide and acetone. For 100 kg. of crude, in all 227.5 liters of carbon bisulphide and 334.1 of acetone were required. The gum was first worked in dough mixer with 50 liters of carbon bisulphide; later 40 liters of acetone were added and mastication continued. The mixture of solvents was poured off, 97.5 liters of CS added, and mastication resumed. After a time 50 liters of acetone were added, thus precipitating the rubber. The solvents were poured off, and 20 liters more of acetone added, which was poured off after a brief mastication. The third and fourth treatments began with 40 liters of CS, followed by 56 liters af acetone. The mixed solvents were poured off and 56 liters of acetone added in each case as a sort of after-wash, to remove resins and granulate the rubber.

Another process belonging in this group is that of Lawrence, in which Guayule, which had been previously removed from wood by solution in naphtha, was treated with alcohol, which precipitated the rubber and dissolved tte resin. After thoroughly washing the rubber to remove the last of the resin, the solution was evaporated, leaving the resin behind in the kettle.

(4) Extraction of the resin, followed by removal of the rubber from the wood: This process is the opposite of that of Lawrence mentioned above. Foelsing proposed to extract the ground Guayule shrub with acetone, followed by removal of the rubber by solution in naphtha. The solvents were removed by evaporation. Both these processes are of rather questionable value owing to the fact that they could only be carried on in the region where Guayule is harvested, which territory is not very satisfactory for extensive chemical operations. The solution processes for separation of rubber from Guayule shrub have nearly all been abandoned in favor of mechanical methods.

(5) Extraction with a resin solvent: These processes are modifications of analytical procedure for determining the percentage of resin in crude rubber, which subject was investigated by C. O. Weber, who concluded that acetone is the most satisfactory resin solvent, and states that it will, particularly at higher temperatures, easily dissolve all the resinous constituents of rubber gutta-percha and balata without dissolving a trace of any of these bodies themselves. The processes under this head involve the extraction of rubber with acetone, alcohol or other resin solvent which does not attack the gum.

The first patent granted in this country in which definite claim to deresination of rubber was made was the one previously mentioned which was granted to Lawrence (in 1902). It involved the treatment of Guayule containing some naphtha with alcohol. The extracting plant consisted of a churn which was provided with a corrugated bottom with corrugated rollers, which in passing over it masticated the rubber in the presence of the solvent. The saturated liquid was removed to a still, the acetone and naphtha evaporated and run into tanks for further use, leaving the resin behind.

A process closely related to analytical practice is that of Eves, in which a car containing rubber is exposed to the vapors of alcohol or acetone, which pass through and around the mass, which is worked by rotating arms within the car. The condensate falls from the condenser upon the rubber, thus giving extraction at or near the boiling point of the solvent, which point was particularly recommended by Weber. At least one large plant was successfully operated under the Eves patent, and several hundred tons of rubber were treated by this process.

Practically all deresinating plants in operation in this country in 1912 used acetone as the resin solvent. Of particular interest now are the patents of Chute, which cover the use of the acetic esters of ethyl and methyl alcohols. He states that acetone will dissolve when hot only 18 per cent. of Pontianac resin, some of which will crystallize out on cooling. Methyl acetate dissolves 25 per cent. of the resin and ethyl acetate 50 per cent. These esters were used in conjunction with acetone. In other words, Chute discovered a mixed solvent which has no effect on rubber, but holds a high percentage of resin. The chief objections to the use of these esters are their high price and the relatively small quantities available. Solvent loss was formerly quite a factor, but with modern apparatus this should be reduced to a negligible factor. If deresination by means of a resin solvent is decided upon, the mixed solvents of Chute would probably be superior to acetone, since smaller volumes of solutions could be handled, requiring less equipment and giving a lower solvent loss.

(6) Two solvents, one to swell the rubber, the other to dissolve the resin:

The processes which come under this head were in general use and a rather large volume of deresinated Guayule was prepared in this way. The resin solvents employed were chiefly alcohol or acetone, while gasoline was used almost entirely for swelling the rubber. They were combined and used as a mixed solvent. The usual proportions were 47 per cent. gasoline and 53 per cent. acetone by volume. You will note that the Lawrence patent also comes under this classification. The idea is indicated, though rather imperfectly described, in French Patent 404,307 (1909) to the Caoutchouc Company, which describes a process in which a little benzine is added to soften and swell the rubber to the gelatinous condition, but not enough to dissolve it, after which acetone was employed to remove the resins. The process described later in this paper also comes under this classification.

Apparatus. All those who are familiar with the preparation of rubber cements realize that no solvent can properly act on large masses of rubber without constant mastication. This principle is of the greatest importance in deresination, no matter which process is used. Means must always be provided for bringing the solvent in intimate contact with the rubber. The closed vessel in which the rubber and solvent are worked together, usually by rotating arms or rollers, is called the churn.

U. S. Patent 821,717 was issued to F. C. Hood in 1906 for such an apparatus. A set of ordinary rubber washing rolls were mounted in a water-tight covered chamber which was filled with deresinating liquid to a point above the rolls. The sheet of rubber was made to pass through the rolls, then up and through once more.

There is also a patent to Lawrence, previously mentioned, for a corrugated roller passing over a corrugated bottom.

Whether the treatment in the churn is continuous or intermittent, the solvent soon becomes charged with resin from which it must be separated by distillation. A still has been designed for this purpose by Chute with the special purpose of preventing foaming, which would carry some of the resin into the distillate. It is a combination of a chambered column still, provided at its base with a quieting and settling chamber, which is connected to a sort of boiler through a large tube. Vapor from the boiler enters the settling chamber near the top.

Chute has worked out a process which is especially suitable for his mixed resin solvent, i. e., acetone with ethyl or methyl acetate. The apparatus comprises a series of extractors provided with means of heating and mastication. The solvent is admitted to the extractors on the counter current principle, with a view to treating the rubber in each at least four times or more. The process permits the treatment direct of crude rubbers without drying, since it has been found cheaper to remove the moisture by use of solvents than by drying in the ordinary way. Price calculations on Guayule and Pontianac have been previously discussed.

Properties of Elderberry Seed Rubber

By R. Daniels

There are, as it is well known, a great variety of rubber-yielding plants, but the knowledge of the rubber man of the varieties that do not contain rubber in commercial quantities is very meager. Nevertheless, much valuable knowledge regarding rubber and its phenomena can be obtained from rubber-yielding plants that have no commercial importance as far as the rubber industry is concerned.

Elderberries, for instance, contain a small amount of rubber of a kind that in appearance is very similar to guayule. The author has investigated these berries and found that it is the seed only contains rubber, and this in the form of a thin film enclosing and protecting the seed.

The quantity of rubber contained in elderberry seeds varies very materially with weather conditions prevailing during the summer season. In very wet weather the rubber content is frequently as high as six per cent. On the other hand, if the summer is excessively dry, the seeds of elderberry bushes will be found to contain as low as one per cent and less rubber.

Elderberry rubber, as originally obtained, is soft and tacky, and brownish-green in color. After being boiled for 30 min. in a normal alcoholic potash solution, about 10 per cent of the rubber becomes saponifiable, and the quality of the treated rubber is considerably improved.

Elderberry rubber, mixed with 5 per cent of sulphur and 20 per cent of mineral filler, and heated at 290 deg. F., in a press for 30 min., becomes vulcanized, but shows only a low degree of stretch compared with guayule.

By subjecting the original sample to acetone extraction until a constant weight of loss is obtained, the following results are shown: approximately 30 per cent becomes soluble. This portion is waxy in appearance and only partially saponifiable by alcoholic potash solution. The 70 per cent that is insoluble by acetone presents a most surprising phenomenon. It is fibrous in appearance, similar to cotton, and of a greenish-brown appearance.

Though the author has not as yet been able to find an explanation for this phenomenon, he believes that the waxy matter has a swelling effect on the fibrous part, comparable to the action of gasoline on rubber. This opinion leads the author to believe that it might be better to describe rubber as a "colloidal fibre" instead of using the physical name so far applied to it.

The author is pursuing his study of this particular subject, and hopes in the near future to be able to contribute a special article devoted to an exhaustive study of this complicated subject.

Development of the Goodyear Export Organization

By D. L. Brown *

The beginning of Goodyear's export organization was somewhat akin to that of Topsey—it was not born, it just happened. It was a sort of a natural development from circumstances governing the progress of the Goodyear Tire & Rubber Company in the United States.

As the name and fame of Goodyear and the Goodyear products spread throughout this country, and the company had in the short space of about ten years come from an humble beginning to a high place in American industry, it was only natural that orders for certain Goodyear manufactured rubber articles should begin to come in from foreign countries.

Goodyear Export Division Staff.

Gradually the number of these foreign orders grew until it was found necessary to detail one man to handle the foreign business. That was in 1911—eight years ago—and now the export department of the Goodyear Tire & Rubber Company in Akron, Ohio, consists of a force of over fifty selected and resourceful men trained in the export business.

And the Goodyear automobile tire is one of the most widely known brands in the world simply by reason of the progressive tendencies that prompted the building up of this export organization in spite of many seemingly unsurmountable obstacles.

In doing business in foreign countries, or rather in starting it, there are many trade objections to be overcome—there are numerous resistances to the introduction of an American competing product which have to be carefully analyzed. First of all, of course, there is the necessity for adapting the successful American sales methods in order to make them appeal to the foreign buyer.

One of the biggest drawbacks, for instance, in the tire business, which was first encountered by the Goodyear Tyre & Rubber Company (Great Britain) Limited, was the fact that in that country practically all tires had been sold on the consignment plan whereas it was the Goodyear policy *not* to sell any of its goods in that fashion.

Really the first step in the development of Goodyear export business was taken with the establishment of the Goodyear Tyre & Rubber Company of Great Britain, Limited, in 1913, with offices in London and sub-branches in the leading cities of England, Ireland and Scotland; and after some little sparring this company was able to get a large volume of the British tire and tube business through American methods slightly changed to harmonize with English trade ideals. Through this company all the business in Europe was handled, as it was then thought that nearly all foreign business came from or through England.

This was soon found to be a mistaken idea and a new policy was decided upon. A little later a direct Goodyear branch was opened at Mexico City which was very successful until the internal troubles of that country disrupted all business affairs.

In 1914, just before the war, Australia and New Zealand attracted attention with the result that the Goodyear Tyre & Rubber Company of Australasia, Limited, with headquarters at Sydney, and the Goodyear Tyre & Rubber Company of New Zealand, with headquarters at Wellington were organized. This meant of course that the business in other British countries was to be handled independently of London.

The South American field began to loom up in the same year, 1914, and Goodyear was quickly on the ground, the Goodyear Tire & Rubber Company of South America being organized with branches at Rio de Janeiro and São Paulo, Brazil and Buenos Aires, Argentina. The operation of this company has been very successful and all the branches are thriving.

The Goodyear Tyre & Rubber Company of South Africa, Limited, was the next step in the Goodyear export development, and the headquarters at Capetown are among the busiest of all. Branches of this South African company are maintained at Prêtoria, Johannesburg, Durban and Port Elizabeth.

A direct Goodyear branch at Havana, Cuba, was opened to take care of the business of the Island Republic, while

* Manager of the Export Division Advertising Department of the Goodyear Tire & Rubber Company, Akron, Ohio.

the rest of the West Indies business is handled directly from Akron by means of dealers and distributors.

The Spanish company, Cia Española de Neumáticos y Caucho Goodyear (SA), with offices at Madrid, and a branch at Barcelona, Spain, and the Goodyear Tyre & Rubber Company of the Dutch East Indies at Soerabaya, Java, were organized and just beginning business when the war interfered with further development for the time.

So with the advent of general hostilities the record of the Goodyear Tire & Rubber Company was such that within a space of a half dozen years, it had succeeded in developing one of the most comprehensive and extensive of all American foreign export businesses, and in doing this it had carried out its American merchandising ideals of service with the product —a business factor somewhat new in the foreign fields, particularly in the motor car or allied businesses.

Of course this sweep of the export business was not accomplished without encountering many obstacles to say nothing of the business deterrents in the way of home manufacture, competition, etc., and the low wage scales of certain foreign countries. The overcoming of natural prejudices was an important factor, especially during the early days of the war, when there were decided feelings throughout the British Empire that no "alien" goods should be bought and used; and American goods at that time were included in the term "alien." But intensive salesmanship, backed by high grade products, together with a merchandising policy founded on service, won out for the Goodyear Tire & Rubber Company in foreign fields just at it had placed the company high in public favor in the United States.

The Goodyear Tire & Rubber Company has always believed that it is best to maintain direct branches in foreign countries wherever the business warrants, officered by its own Akron trained men and using native local help for sales and clerical work. The salesmen, however, and the important clerks, are sent periodically to the United States to undergo a special course of training at the factory headquarters. Here sales schools are maintained regularly, and courses are provided in business management ,and even in foreign languages for the beenfit of those who wish to learn new ones.

When there is a good volume of business to be secured a Goodyear company is started in the larger countries acting more or less independently of the United States organization and promoted locally as far as possible.

When this is not done then general distributors are carefully selected who themselves establish and maintain subbranches. Of course there are a lot of smaller countries where distributors are not necessary or practical, and then the Goodyear Tire & Rubber Company at Akron, Ohio, deals directly with small dealers.

Goodyear advertising is a noticeable feature in the magazines and newspapers all over the world and much attention is given to this work. In Akron it maintains an Export Advertising Department with eight or ten people constanly on the staff directing the details of campaigns throughout the world and formulating plans for the far flung sales-assistance.

Last year some forty campaigns were conducted in about thirty-six countries in several different languages. This year, owing to the cessation of the war and the determination of the company to increase its foreign business, 112 separate advertising campaigns are being planned out of Akron to run in seventy-two countries.

The Export Department is ably managed by R. H. Daniels, who has been in the service of the company for a long time in various capacities. Mr. Daniels is an organizer of rare ability, and gifted with a clear vision of future American trade and particularly of the way in which the Goodyear Tire & Rubber Company can take advantage of business trends and developments. His department is made up of several divisions whose business it is to oversee promotional, distribution and sales work in all parts of the world. For instance, there is a Far Eastern Division, with C. H. Williams in charge; a European Division, with C. L. Diers in charge; an Australasian Division, with A. G. Cameron in charge. These men were formerly district and branch managers in the United States. There is also an Export Merchandise Distribution Division, and an Export Promotional Sales Division.

The Export Department sends out its own representatives to distant points, to back up the work of its distributors, affiliated companies or dealers.

There is a Goodyear Tire & Rubber Company in Canada with headquarters at Toronto in addition to the other mentioned companies abroad. This Canadian company maintains two factories, one at Bowmanville and one at Toronto, and is incorporated in the Domnion as a separate proposition.

Goodyear has not only developed a foreign field *for its own products* but has at the same time shown that it is not only possible but comparatively easy for any American business concern really in earnest, to enter foreign markets in the face of the most active kind of competition and gain a high place, with additional chances of widening the scope of all American businesses abroad when the world finally gets back on an assured peace basis. That is to say, that because of certain Goodyear activities in the foreign fields where perhaps the Goodyear Tire & Rubber Company has been a pioneer, the chances for other American manufacturers doing business there have increased, for wherever the Goodyear Tire & Rubber Company operates it not only develops its own market but endeavors to stimulate American trade as a whole; and with that end in view has selected men of broad vision, of pleasing personality, ability and business power to represent it.

Perhaps one of the most fundamental reasons for the Goodyear export success has been the control of its world-wide business from the headquarters in Akron and because with progressive high-mindedness, the company is and has been determined to encircle the globe with *good will*. The principles of courtesy, service ,efficient and high grade salesmanship, are best controlled from *one source*.

Balata in Hard Rubber

Requiring a hard rubber compound for a purpose in which it was necessary to have a stock that would become very soft under the influence of heat previous to vulcanization, the author attempted to use balata. A number of experiments proved, however, that balata could not be vulcanized to the same degree of hardness as rubber can.

The main difference between the hard material produced from rubber and that produced with balata was that the former was possessed with a high tensile strength and ideal elasticity, while the balata compound produced a material showing a comparatively low tensile strength and very brittle.

Experiments were made with compounds containing various proportions of sulphur to balata, and cures were varied in length and temperatures. The best product was obtained from a mixture containing 34 per cent of sulphur, which was cured for two and a half hours at a temperature of 290 deg. F. in a vulcanizing press, in the shape of a sample one-eighth of an inch thick. This sample showed a maximum tensile strength of 1720 pounds and was very brittle. No doubt the result was a very poor one compared with the maximum tensile strength that was obtained with ebonite made of rubber, which showed over 8000 lb, of tensile strength.

As to the reason for the poor results obtained with balata, this was no doubt due to the fact that balata contains a high percentage of resinous matter, which accounts for the low tensile strength. This belief was borne out by experiments that were made with grades of rubber such as guayule, which contain much resin and produce an ebonite having a low tensile strength.

Personal Notes of the Rubber Trade

New Sales Manager of New Jersey Zinc—Goodrich Boys Promoted—Boston Rubber Shoe Entertains—Kaeppel Goes to Federal—Wife of Rubber Association Secretary Dies

Peters Directs N. J. Zinc Sales

Edward V. Peters has been appointed general sales manager of the New Jersey Zinc Company, New York City, in which position he succeeds Herbert C. Clopper, now vice-president of the Eagle-Picher Tread Company, Chicago, Ill.

Mr. Peters was born in St. Louis, Mo.,

EDWARD V. PETERS

in 1881, but has been a resident of New York City for many years, his first business experience having been in the electrical department of the Manhattan Railway system.

In 1903 he organized a purchasing department for T. D. White & Company, engineers and contractors, New York City, and remained in charge of it until 1906, when he became assistant purchasing agent for the New Jersey Zinc Company. In 1913 he became chief purchasing agent and later assistant sales manager of the company of which he is now general sales manager.

Mr. Peters is considered as a man of remarkable business ability. He is a great believer in organization and cooperation, and this trait will undoubtedly prove very valuable in his new position.

Goodrich Boys Promoted

Charles C. and David Goodrich, sons of the late Dr. B. F. Goodrich, founder of The B. F. Goodrich Company, Akron, Ohio, have been promoted by the War Department. Major Charles C. Goodrich is now a colonel, and his brother, who also was a major, has been promoted to the rank of lieutenant-colonel.

Miller Promotes Jennings

R. R. Jennings, manager of the cost department of the Miller Rubber Company, Akron, Ohio, was elected comptroller of that company at the annual meeting of its stockholders, a promotion that has caused widespread satisfaction in Miller circles.

Entertain U. S. Rubber Officials

On Tuesday, May 20th, the Boston Rubber Shoe Company, Malden, Mass., received a long deferred but most welcome visit from Vice-President Homer E. Sawyer. With general footwear factory manager, M. H. Clark, factory manager, G. L. Lawrence, and superintendent P. C. Benjamin, Mr. Sawyer made the tour through Factories Nos. 1 and 2.

At Factory No. 1 where Mr. Sawyer served his apprenticeship in the rubber business as assistant superintendent, he was cordially greeted by a number of the employes who had continued with the Company since that time.

The Boston Rubber Shoe Association promptly called a special meeting for the evening at Fells Hall, at which it was the privelege of the Association to entertain Mr. Sawyer and Mr. Clark.

An excellent dinner was served and at the head table were the two chief guests of the evening, Mr. Sawyer and Mr. Clark; the president of the association, H. E. Guilford, factory manager, George L. Lawrence, superintendent Philip C. Benjamin, assistant superintendent Horace E. Child, employment manager John T. Cooper, Superintendent A. D. LeBaron of the Last Factory and Works Engineer Elmer O. Goodridge. Francis Ginns the popular foreman of the Packing Department acted as song leader, and Allen McKinnon rendered some excellent recitations.

President Guilford welcomed the guests and Mr. Sawyer was elected to honorary membership in the Association, Mr. Clark being already an honorary member.

Factory manager Lawrence was introduced as toastmaster and responded gracefully but briefly. Employment manager Cooper extended greetings on behalf of the employes and officials, more especially representing those who were associated with Mr. Sawyer during his factory experience.

Mr. Clark was warmly received and spoke earnestly of the great importance of the best possible industrial relations and of the great value of the foreman's influence. He referred to some of his observations and experiences in France, and described wonderful salvage plants where piece work had practically solved the labor problem.

The address of Mr. Sawyer was of deepest interest, as an interpretation of the desires of the United States Rubber Company as to the relationship with the employes. He spoke in terms of simple sincerity, of his great concern in the personal interests of the employes, referring frequently to the old friends in the factory whom he had never forgotten. He closed with the statement that he had never seen the factories in such fine condition as they are today.

F. E. Kaeppel with Federal

F. E. Kaeppel, formerly with the United States Rubber Company's Chicago branch, and for seven years in the jobbing trade department of the Mechanical Rubber Company, Chicago, Ill., is now covering Chicago and the Middle West for the mechanical department of the Federal Rubber Company, Cudahy, Wis.

Obituary Notes

C. J. Adams

C. J. Adams, of Fred Stern & Company, crude rubber importers, 277 Broadway, New York City, was taken ill suddenly with pneumonia and died on Saturday, May 17.

Mr. Adams had been in the crude rubber business in New York City for many years. Coming here from Boston, Mass., he started with Hagemeyer & Brunn,

C. J. ADAMS

crude rubber merchants and later joined the firm of Mr. A. W. Brunn.

On the death of Mr. Brunn, Mr. Adams came to Fred Stern & Company who were then first opening their New York offices.

Mr. Adams was well known and liked in the rubber industry and the news of his sudden death will be a shock to his numerous friends.

Alberta Sutherland Vorhis

Alberta Sutherland Vorhis, wife of Harry Stephen Vorhis, secretary of the Rubber Association of America, died Saturday night, June 14, at the home of her mother in Waltham, Mass.

Mrs. Vorhis was born twenty-nine years ago in Springfield, Nova Scotia, Canada, where she spent her childhood. Later she came to Boston, Mass., with her family, where she was married in 1914 to Mr. Vorhis. The burial took place in Springhill, Nova Scotia, Canada.

Daniel J. Kirkham

The death of Daniel J. Kirkham, who from July, 1918, until his last illness had served the McGraw Tire & Rubber Company in the capacity of mechanical engineer, occurred May 16. He was born in Trenton, N. J., in 1880, educated in the public schools of that city, and the Trenton Mechanical School. Practically all of his business life was spent in the practice of his profession. He had been connected with the Quaker City Rubber Company of Philadelphia, and the United and Globe Rubber Company of Trenton, N. J. He also spent nine years in the employ of the Dunlop Tire & Rubber Company, of Toronto, Canada. He severed his connection with the last mentioned company to become a member of the McGraw organization, where he made many close friends among his associates.

News of the Rubber Metropolis

Litchfield Gives Scouts Another Outing and Lectures—Firestone Promotions —Akron Maderite Tire Formed—Goodyear Men to Help Manage Plant—Firestone Secretary Off for Far East

Akron Boy Scouts Outing

Fifty boy scouts with their officers will leave Akron, Ohio, June 26, on one of the most unique motor truck camping trips ever attempted in America.

The expedition, arranged through the generosity of The Goodyear Tire & Rubber Company, will consist of a caravan of five big Goodyear trucks diverted from that company's Akron-Boston express line on which they are constantly transporting rubber products.

The party will cover 3,000 miles and pass through nine states, visiting the beautiful scenic and historical points along a route leading through Niagara Falls, Syracuse, Utica, Albany, Lake George, Lake Champlain, White Mountains, Portland, Me., Boston, Providence, New Haven, West Point, Ithaca, Lake Chautauqua and Youngstown, back to Akron.

A moving picture scenario has been written for the scouts and they will enact various scenes for the cameraman.

Three large trucks will carry the party, a fourth will transport the baggage and camping outfits, while a fifth will carry the field kitchen and the eats.

The scouts will camp beside lakes and scale mountains and sleep in the shadows of old forts where now antiquated cannon boomed forth a hundred years ago.

The pneumatic tired trucks, with double deck providing upper and lower sleeping berths, insure the same comfort for passengers as that furnished in Pullman cars. Two shifts of drivers will be with each truck, permitting travel at night while the boys are rolled up in their bunks.

The expedition, aside from furnishing a tour for the scouts, will demonstrate the ease with which troops can be transported by truck from inland points to the coast.

Messages from the governor and mayors in one state to similar officials in other states, will be carried by the scouts, while scout councils along the route will welcome the caravan with receptions and demonstrations.

This is the second motor hike of the Akron scouts, the first having been taken last summer through the courtesy of vice-president, P. W. Litchfield, of the Goodyear Tire & Rubber Company, who is president of the Akron Council of Boy Scouts.

The party is to be composed of selected scouts, picked in competitive examination for their general knowledge of scoutcraft.

Goodyear Has Movie Department

(Special Akron Correspondence)

The Goodyear has inaugurated a motion picture department in charge of Robert W. Teed who has been identified with the film industry since its inception. It is the purpose of the company to obtain a permanent record in motion pictures of their entire factory production for educational work.

Goodyear Men Off for China

(Special Akron Correspondence)

Passport applications have been issued by County Clerk A. C. Bachtel to William A. M. Vaughan to travel in China, Japan and elsewhere in Asia, and to Augustus G. Cameron and wife, and Harold E. Langdon to travel in Australia and New Zealand, all in the interest of the Goodyear.

Firestone Changes

(Special Akron Correspondence)

The Firestone Tire & Rubber company has announced three changes in the personnel of the factory organization:

J. W. Thomas has been appointed works manager; J. C. Reich, superintendent of Plant No. 1; and W. R. Murphy, superintendent of labor.

Mr. Thomas is one of the veteran employes at the Firestone. He was hired by H. S. Firestone for $90 a month 12 years ago. He had previously been with the Goodrich. He installed the first Firestone Laboratory and acted as chief chemist for a year and a half. Later he became head of the night shift at the factory and then factory superintendent.

Reich was with the Western Electric company at Chicago for nine years before coming to the Firestone. While there he developed much of the machinery that is used in the finishing of rubber good. He has been superintendent of labor at the Firestone for the last year or so.

Murphy who takes the position left vacant by the promotion of Reich, is another Firestone veteran. He has been with the organization for 11 years. During the war he was at the Rock Island arsenal where he made an enviable record.

Goodrich Engineers' Banquet

(Special Akron Correspondence)

Over 200 engineers from the engineering and experimental departments of The B. F. Goodrich Co. banquetted March 5 at Young's hotel. The purpose of the banquet was to enable each member of the departments to become better acquainted with fellow-workers.

Goodyear Employes Vote

(Special Akron Correspondence)

The employes of the Goodyear Tire & Rubber company voted the week of June 16 on the adoption of the industrial democracy plan which has been laid before them to give the men a chance to help shape the policies of the company. It was expected that 10,000 votes would be cast. If the plan carries the men will be given a voice in shaping the plans of the concern through a form of government similar to that of the United States.

Litchfield Lectures

(Special Akron Correspondence)

Since his return from Europe, P. W. Litchfield, factory manager of the Goodyear, has received many invitations to address local organizations. He recently spoke before the Men's Bible class of the West Congregational church on "Present Industrial Conditions in Europe and America and How to Meet Them."

Carkhuff Visiting Plantations

(Special Akron Correspondence)

Stacy G. Carkhuff, secretary of the Firestone Tire & Rubber Company, has started on an extended trip to the East Indies in the interest of the company. He will wind up his journey with a trip around the word. Mr. Carkhuff planned to spend some time in Sumatra among the rubber plantations.

New Tire Company

(Special Akron Correspondence)

The Akron Maderite Tire & Rubber company has incorporated for $1,000,000 divided into 5,000 shares of seven per cent. preferred cumulative, fully paid non-assessabe and tax free stock, and 5,000 shares of common.

The officers of the company are: N. A. Wolcott, president, who is also president of the Packard Electric Co. of Warren, O.; vice president, B. L. Eaton, president of B. L. Eaton & Co., brokers in the Metropolitan building, Akron, and president of the B. L. Eaton Audit Co.; secretary and treasurer. Thos. Walsh, Youngstown, O. Wilmer Dunbar will be general manager. He was formerly general manager of the Pennsylvania Rubber Co. and designer for the Pennsylvania Vacuum Tire & Rubber Co.

The company has acquired a 10-acre tract at Newton Falls and is erecting its first unit now which is constructed of brick reinforced with steel, two floors with basement 60x240 feet. The power house is separate from the main building and of the same construction as the main building, with dimensions 20x60.

Goodrich Erecting Giant Structure

(Special Akron Correspondence)

One of the largest warehouses in Ohio will soon be erected by the B. F. Goodrich Rubber company on property the company now owns adjoining its big factories. It is understood that the company is planning to spend $3,000,000 for warehouses. Two new buildings will be erected, it is said, one for the storage of raw materials and the other for the finished product.

Purdy & Henderson, New York architects, are now working on plans for a $900,000 mill and warehouse.

Goodyear Opens in Colon

(Special Akron Correspondence)

The Goodyear Tire & Rubber company has opened a distributing warehouse at Colon, Panama. J. H. Proeger who has been branch manager at Havana, Cuba, for several years, is in charge of the new office. Extension to facilities for export distribution was made necessary by the opening of this branch to take care of the growing demands for Goodyear products in Central and South American countries.

New territory that will be served from the Panama office includes the following countries: Costa Rica, Nicaragua, Bolivia, Venezuela, Dutch and British Guiana, Chile, Peru, Honduras, Salvador, Colombia, Ecuador.

Rubber Companies Purchase More Land

(Special Akron Correspondence)

The Goodyear Tire & Rubber Company has purchased several parcels of land in the second Jewett allotment, East Akron, for $135,000. No announcement has been made by the company as to what it intends to use the land for.

The B. F. Goodrich Company has bought the old Harry Gray property on S. Main street for $85,000. The land will be used for factory additions.

Polson to Build

The Polson Rubber Company, Cleveland, Ohio, manufacturer of tire accessories, is preparing to build a large modern factory to take care of its increasing business. H. B. Polson is president, while C. A. Polson is secretary and treasurer of this company.

Building Activities in the Industry

New Tire Factory for Trenton—Muehlstein Fire Damages Repaired—Larger Gillette Output—Eagle-Picher Adds New Line—Standard-Four Building—Other Building Activities

Atlas Plant in Trenton

Work has been commenced on the $250,000 plant for the Atlas Tire & Rubber Company, on Enterprise Avenue. The plans for the buildings were prepared by J. Osborne Hunt, and the contracts have all been let. It is the intention to have the building completed at the earliest possible date, when machinery will be installed and employment given to about 200 persons. The company will manufacture automobile tires and tubes, and the plant will have a capacity of 500 tires daily.

Brick, steel and concrete will be used in the construction of the buildings. One of the structures will be 90 x 360 feet, another, the engine and boiler rooms, 82 x 92 feet, and another, of steel. The company will also have an 800-foot siding constructed to the new plant.

It is estimated that the cost of this new plant will be in the neighborhood of $250,000.

The tire making process to be installed will be that of the John E. Thropp's Sons Company.

Henry A. Ludeke is the president of the Atlas Company; Ira Worthington, vice-president, and R. Unkles, the secretary. The two former officials were at one time connected with the DeLion Tire & Rubber Company.

Muehlstein in Old Quarters

H. Muehlstein & Company, the well-known dealers in scrap rubber, announce that they are again occupying their former offices at 2401-2407 Third Avenue, New York City. It will be recalled that the Muehlstein offices were destroyed by fire several months ago and that the company was obliged to occupy temporary quarters during the rebuilding of these offices which has now been completed.

New Factory for Oklahoma

A plant for manufacturing inner tubes is beng erected at Sand Springs, near Tulsa, Okla., by the U. S. Compression Inner Tube Company, of which M. C. Hale is president. It is reported that the plans are to produce 1000 tubes and 500 casings per day.

Traveler Tire to Build

The Traveler Tire & Rubber Company, Traveler Building, Philadelphia, Pa., is having plans prepared by J. O. Hunt, architect, 114 North Montgomery Street, Trenton, N. J., for a 2-story, 60 x 250 feet rubber factory to be erected at a cost estimated at $250,000, in Bethlehem, Pa.

Standard Four to Enlarge

The Standard Four Tire Company, Keokuk, Iowa, is planning to spend approximately $100,000 in the enlargement of its plant. It is planned to double the present capacity of the plant and to have the additions ready by July. The company is extending its distribution and now includes ten states in its sales.

J. Frank Dunbar Company

The J. Frank Dunbar Company, Inc., crude rubber broker, 82 Beaver Street, New York City, announces that it has opened an office at 610 Flatiron Building, Akron, Ohio, where it will be represented by J. Richard Stanley.

Gillette to Increase Ouptut

The Gillette Rubber Company, Eau Claire, Wis., and New York City, announces its expectation of reaching a daily production of 1,000 tire casings and 2,000 inner tubes within a short time. This announcement was embodied in the report of S. P. Woodard of New York, president of the company, which was read at the company's annual meeting of stockholders, held in Eau Claire on March 3.

Sales for 1918 amounted to $1,810,000,

American Rubber Expanding

(*Special Akron Correspondence*)

The American Rubber & Tire company is forging to the front among the smaller rubber concerns in the city. Officials of this company recently announced that plans had been completed for the construction of a five-story addition to the factory. The estimated cost of the improvement is $100,000. The Boldt Construction company of Cleveland, has the contract.

Yale Tire to Build

The Yale Tire & Rubber Company, 827 Elm Street, New Haven, Conn., plans to build a factory and power house on Dixwell Avenue, Hamden, Conn. It is estimated that the undertaking will cost $100,000.

Partridge Enlarging Plant

The F. E. Partridge Rubber Company, Metcalf Street, Guelph, Ont., Canada, plans to build a 3-story addition to its plant. It is understood that the company will need new machinery for the equipment of this addition.

Quality Building in Anderson

The Quality Tire & Rubber Company, Anderson, Ind., is building four additions to its plant, according to a report from that city. Plans are said to include a 100 x 400-ft., building. C. J. Hodges is general manager of the Quality company.

Goodyear to Expand Again

(*Special Akron Correspondence.*)

An important announcement is expected soon from the Goodyear offices. This company has plans for immense factory additions, and is entering the boot and shoe business, which will entail a great outlay.

Mishawaka Woolen Company

The Mishawaka Woolen Manufacturing Company, Mishawaka, Ind., manufacturers of rubber footwear, plans to add to its plant a 3-story paper-box factory to cost approximately $25,000.

North Star Rubber

The North Star Rubber Company, L. Hoffmeister, 176 16th Street, Sheboygan, Wis., plans to build a 2-story, 60x95-foot factory on Michigan Avenue, that city. The plant will cost approximately $45,000.

Perfection Tire and Rubber

The Perfection Tire & Rubber Company, Fort Madison, Iowa, has awarded the contract for the erection of a 3-story, 100x220 ft. factory, to cost approximately $100,000.

Eagle-Picher Selling "Sterling" Lithopone

The Eagle-Picher Lead Company has purchased an interest in the Midland Chemical Company, Chicago, Ill., manufacturers of the well-known brand of "Sterling" lithopone. The offices of the Midland Company will be removed to quarters in the Continental & Commercial National Bank Building, Chicago, Ill., adjoining those now occupied by the Eagle-Picher Lead Company.

The manufacturing operations will be continued upon the same high standard as heretofore; and, with the added facilities of the research laboratories of the Eagle-Picher Lead Company to call upon, the trade can be assured of a quality of lithopone excelled by none.

The new board of directors of the Midland Chemical Company is as follows: O. S. Picher, president; W. T. Sheffield, vice president and secretary; T. S. Brown, Jr., treasurer; A. W. Ayer, superintendent; H. G. Clopper.

Standard Increases Output

The Standard Tire & Rubber Company, Willoughby, Ohio, which was recently reorganized following its purchase by a corporation headed by R. J. Firestone, Francis Seiberling and T. A. Palmer, has increased its output from 25 to 150 tires per day. A day and a night force are now working at the company's plant.

General Awards Contract

(*Special Akron Correspondence*)

The H. P. Moran Co. has a contract for the erection of a two-story heater room for the General Tire & Rubber Co. This building will cost $60,000 and it will be located on Lucille st. The dimensions are 60 by 140 by 45 feet.

Latex Tire Acquires Site

The Latex Tire Company, Fond-du-Lac, Wis., has acquired a site on East Scott Street, that city, and plans to build a plant for the manufacture of pneumatic tires and inner tubes, to cost approximately $30,000. T. W. Meiklejohn is in charge of the work.

Jonesboro Company Expanding

The Indiana Rubber & Insulated Wire Company, Jonesboro, Ind., has begun work on an addition of a three-story brick building, 60 x 125 feet, which will greatly increase their production of bicycle and automobile tires.

Hodgman to Enlarge

The Hodgman Rubber Company, Tuckahoe, N. Y., is having plans prepared by W. L. Stoddard, architect, 9 East 40th Street, New York City, for the erection of a one-story, 50x150 ft. addition to its model plant.

Beard to Locate in Lisbon

The Beard Tire Company will locate its proposed factory in Lisbon, Ohio, according to the decision of its directors, who met recently in Steubenville, Ohio. The Baker Planing Mill in Lisbon has been acquired for the purpose.

Hartford Rubber Awards Contract

The Hartford Rubber Works, Park and Bath Avenue, Hartford, Conn., has awarded the contract for a 1½ story, 60 x 79-ft., factory building to be erected on Bartholomew Avenue, Hartford, and to cost approximately $34,000.

TIRE NEWS

Application of Pneumatic Motor Truck Tires

By G. E. Brunner*

In the rapid advance of the motor truck into the various fields of service that have been opened up to it the pneumatic cord tire has played a most important part. For this type of tire has released the motor truck from its former limitations as to speed and cushioning abilities and placed it in a class where its capabilities of making quick deliveries of materials in good condition, are determining factors in computing its value as a transportation agent.

The sizes of pneumatic cord tires for trucks run from 36 x 6 to 44 x 10, accommodating all capacities of trucks up to five tons. In construction they do not differ from pneumatic cord tires for passenger cars. They are, however, larger and heavier, have stiffer beads, and require greater strength and heavier tools in applying them to the rim.

The Rubber Age and Tire News has received many inquiries from its subscribers as to the method of application of these huge tires to their rims. The following article explains the problem in detail.

In the main the accepted method of applying tires on passenger cars is applicable in fitting the larger sizes on motor trucks. There are, however, some exceptions, which are worth noting.

In mounting a passenger-car tire it is customary to first insert the tube in the valve stem hole of the rim, then to pry the tire over the rim. Now with the pneumatic truck tire this method cannot be followed owing to the stiffness of the beads and the width of the rim. So the tire is first laid on the rim with the valve stem directly over the hole in the rim. Then allowed to drip down evenly, the valve stem being pressed down sideways and toward the end of the flap.

When the tire is completely on the rim it can be readily turned from one side to the other until the valve stem appears at the hole, and can be pulled through.

Then the side ring is ready to be slipped into place all around the tire, after which the locking ring will fit into its channel, holding the tire securely.

An important matter which is frequently overlooked is the thorough inspection of the inside of the tire before inserting the inner tube. Care should always be taken to make sure that no dirt, little stones, or perhaps a valve cap, have dropped in the casing. Any foreign

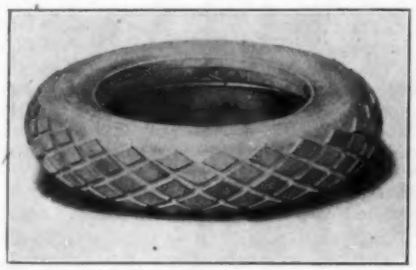


Fig. 2

substance in the casing will cause trouble if left there. Care should also be taken to make sure that there are no thread ravelings and that the lubricator has not caked on in heavy spots.

Fig. 1

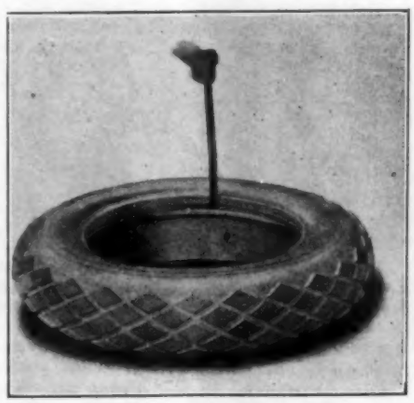


Fig. 3

Inflate Tube

The tube should be inflated to see that it does not leak, and to make a closer inspection of chafing places than could be given if the tube were not inflated. Tighten the valve nut down firmly, but not enough to pinch the rubber—which might be cut by the ring washer. This risk is not incurred when the tube is inflated inside the tire.

Lubricate Tube

The next step is to lubricate the tube with soapstone or powdered graphite, of which a small amount should be sprinkled on that part of the tube which comes between the beads of the tire. Then, with a cloth or brush, the lubricator is spread evenly along the sides of the tube. No lubricator should be used inside the casing, and it should be remembered to use it sparingly on the tube. Too much lubricant sticks, cakes, and does more harm than good.

Now—deflate the tube. To do this, remove the valve inside, lay the tube down on the floor and place the tire squarely on it. The even pressure caused by the weight of the tire quickly deflates it. Then, reapply the valve, taking care that it seats perfectly.

After this has been done, put the tube in the tire, placing it evenly about the tire and making sure that it is not twisted. Put just enough air in the tube to round

Fig. 4

it out firmly, but not enough to expand the beads of the tire.

Next, insert the flap. The flap must be evenly distributed around the circumference of the tire. It may seem at first to be too short, but if smoothed out firmly

* *Manager of the Service Department, Goodyear Tire & Rubber Company, Akron, Ohio.*

it should lie so that its base is in line with the base of the beads of the tire.

Inspect the rim carefully before mounting the tire upon it. Remove pieces of rust or dirt. See that the side and locking rings are in good condition and that the locking ring slot has not been dented in by pounding. Put the inside ring on, making certain that the smoothly curved side of the ring will come in contact with the bead of the tire when the tire is mounted. New types of rims have one permanent side flange affixed.

The tire is now ready to be mounted on the rims.

Mounting

With a small pneumatic tire it is customary, as before said, first to insert the valve of the tube through the valve stem hole of the rim, and then to pry and pound the tire over the rim. This method cannot be followed with a pneumatic truck tire because of the stiffness of the beads and the width of the rim. Instead —you first lay the tire squarely on the rim with the valve stem over the valve stem hole of the rim. (See Fig. 1).

Allow the tire to drop down evenly until the valve stem is reached, then press the valve stem down sidewise and toward the end of the flap. (See Fig. 2).

Hold the valve stem in this position with a thin metal bar, taking care when the tire slips down the rest of the way that the valve stem does not catch in the locking groove of the rim. During the operation a valve cap should be put on the valve stem to protect its threads. New types of rims are being made with valve stem slots that facilitate the application of the Tire. (Fig. 3).

When the tire is completely on the rim it can be readily turned from one side to the other until the valve stem appears at the valve stem hole and can be pulled through. Next the rim nut should be screwed on the valve stem until the valve is fastened securely in the center of the valve stem hole. (Fig. 4).

Fitting Side Ring

The tire is now ready to receive the locking rim, that is to say, the second side ring which will slip over the rim easily if too much air has not been put in the inner tube. By means of a large tire iron, force the side ring down into place all the way round the tire. You should now be able to insert the hooked end of the locking ring into the locking ring hole. Continue to press the side ring down and at the same time fit the locking ring into its channel. (Fig. 5).

Care should be taken not to spring the locking rim during the locking operation, which is shown in Fig. 6. When mounting the 42 x 9 and 44 x 10 size it is necessary to pound the ring somewhat before entering the channel. Care should be taken to make sure that the locking ring has sprung into place around its entire circumference.

FIG. 5

Inflation

The tire is now ready for inflation, and right here it is good to recall the fact that under-inflation ruins tires and that this risk should always be avoided. To make sure that the inflation is proper for the load the tire is to carry, the inflation chart here given should be consulted and a pressure gauge used when inflating the tire. Tires should never be run flat or very much deflated, which means ruin. Overloading should also be guarded against.

PROPER LOADS AND INFLATION PRESSURES

Inflation Pressure Lbs.	TIRE SECTION DIAMETER 4½ in.	5 in.	6 in.	7 in.	8 in.	9 in.	10in.	12in.
80	1350	1570						
90		1660	2000					
100				2700				
110					3650			
120						4650		
130							5800	
140								8500

Note that the ideal tire loads under average conditions are shown. Tires should not be inflated harder than the specified figures.

Financial Notes of the Tire Industry

Rubber Stock Quotations—More Capital for McLean—Lee Financial Statement—Mason Declares Quarterly Dividends—Keystone Pays Extra Dividend in Stock

Akron Rubber Stocks

(Special Akron Correspondence)

Rapid increases in the seling prices of American Rubber & Tire company and Miller Rubber company common stock featured the local market during the first half of June. American common has doubled in recent months, selling well above the 50 mark. Miller common continues to rise, selling as high as 211.

Goodyear common is exhibiting strength again, while Goodrich common is down nearly 10 points from its high mark of the month.

Quotations of June 16:

	Bid.	Asked.
American R. & T.	50	60
do pfd.	102½	...
Amazon Rubber	146	...
Firestone	153	157
do pfd.	100	100½
General	400	...
do pfd.	100	100½
B. F. Goodrich	75	77
do pfd.	104	106
Goodyear	320	328
do 1st pfd.	105½	105⅝
do 2nd pfd.	107⅜	107⅝
India Rubber	205	...
Kelly-Springfield	118	123
Mason Tire	24½	25½
do pfd.	86	...
Marathon	...	55
Miller Rubber	207	212
do 1st pfd.	102½	103½
do 2nd pfd.	106½	107½
Mohawk	300	...
do pfd.	100	110
Portage Rubber	153	156
do pfd.	98	99
Republic Rubber	7¼	8
do 1st pfd.	94	97
do 2nd pfd.	96	98
Rubber Products	145	150
Star Rubber	300	350
do pfd.	98	100½
Swinehart	87	89
do pfd.	87	90

Mason Dividends

The Common stock of the Mason Tire & Rubber Company, Kent, Ohio, showed earnings at the rate of 37 per cent in the second quarter ending April 30. Sales were $896,911.78 and net profits, after depreciation, but before taxes, were $102,224.03. Preferred dividend requirements were $23,300. There is $850,000 of Common stock outstanding, par $10. Sales in the same quarter of 1918 were $501,000, and net $63,234.02. Sales for 1919 second quarter, therefore, show an improvement of 50 per cent over the 1918 second quarter, and an increase in net of 61 per cent.

Lee Shows Substantial Surplus

Net profit of the Lee Rubber & Tire Corp. for the year 1918 was $200,348.20. This is made on a net sales volume amounting to $4,609,924.47 and is after provision for federal taxes as well as interest. As a result of the year's operations Lee now finds itself with a surplus of $241,380.60, and in excellent position to increase its business, as intimated in the report of President John J. Watson, Jr., to his stockholders.

LEE RUBBER & TIRE CORP.

Consolidated Balance Sheet, Dec. 31, 1918

ASSETS	
Cash	$379,977.36
United States Liberty Bonds	47,220.00
Accounts receivable	583,817.97
Trade acceptances	19,448.62
Notes receivable	18,946.58
Inventories	1,322,794.49
Working funds at branches	3,000.00
Charges deferred to future operations	9,259.22
Accrued interest	366.72
Plant and equipment	1,124,954.99
Patents, trade marks, etc.	376,770.59
Total	$3,886,556.54
LIABILITIES	
Notes payable	$500,000.00
Accounts payable	175,202.92
Reserves	331,911.35
Lee Tire and Rubber Co. employes, stock option account	4,470.58
Declared capital.... $750,000.00	
Working capital.... 1,883,591.09	
	2,633,591.09
Surplus	241,380.60
Total	$3,886,556.54

McLean Increases Capital

The McLean Tire & Rubber Company, Cleveland, Ohio, manufacturer of "Champion" tires and tubes, has increased its capital stock from $300,000 to $500,000, of which 3,000 shares are common stock and 2,000 preferred. The company is reported to be running two shifts and to be producing 500 casings and 1,200 inner tubes a day.

Keystone Extra Paid in Stock

An extra dividend of 15 per cent on the stock of the Keystone Tire & Rubber Company, New York City, has been declared by the directors of this company at a recent meeting. This dividend is to be paid in stock and is in addition to the usual quarterly dividend of three per cent in cash.

Personal Notes of the Tire Trade

New Head for McGuire Sales—Tweedy Once More in Tire Industry—Announce Yule's Retirement—Goodrich Branch Manager Home a Hero—Harry Field Visiting Cuba

McGuire Heads Carlisle Sales

The Carlisle Cord Tire Company, Andover, Mass., which has been meeting with much success with its product and has practically finished the construction of its new factory in Stamford, Conn., has had the good luck to secure as general sales manager Clarence V. McGuire, up to now

CLARENCE V. MCGUIRE

vice-president of Van Patten, Inc., the well-known New York advertising agency.

Mr. McGuire is not a stranger to the tire business, having seen long service in the advertising department of the United States Tire Company, New York City, at the time when T. M. Gilbert, now one of the controlling factors in Carlisle affairs, was general manager.

Since his connection with the United States Tire Company, Mr. McGuire has successively and successfully handled the advertising of a number of automobile companies. He also has handled Carlisle cord advertising from the first and is, therefore, very familiar with the ideals and activities of that company.

In entering the Carlisle organization, Mr. McGuire becomes a director with the other associates of the company, and a member of the executive committee. Temporarily he will have offices in Andover and in New York City, but as soon as the Stamford factory is completed he will make his headquarters there.

Carolina Tire Increases Capital

The Carolina Tire & Accessory Company, Columbus, Ohio, has increased its capital from $15,000 to $50,000, of which $25,000 is paid in.

W. E. Anderson Curtis Sales Manager

Walter H. Anderson has become associated with the Curtis Tire & Rubber Company, Muskegon, Mich., in the capacity of sales manager.

O. S. Tweedy Returns to Tire Business

O. S. Tweedy, whose resignation from the position of vice-president of the L. A. Young Industries, Inc., Detroit, Mich., was announced in the May 25, 1919, issue of THE RUBBER AGE AND TIRE NEWS, has decided to return to the tire business in the capacity of Vice-President of the Dryden Rubber Company, Chicago, Ill.

Mr. Tweedy has been prominently associated with the tire industry for the past twenty years, having been ten years with the United States Tire Company, New York City, and previous to that with the Diamond Rubber Company, Akron, Ohio.

The Dryden Rubber Company is a well established manufacturer of mechanical rubber goods and inner tubes and is now preparing to go into the manufacture of automobile tires on a large scale, in which development Mr. Tweedy's knowledge of the marketing of tires undoubtedly will prove a great asset.

Mr. Tweedy's headquarters will be in Chicago, Ill., at the main offices of the Dryden Rubber Company, 1014 South Kildare Avenue. This concern maintains direct factory sales branches in Detroit, Mich., and Boston, Mass.

Goodrich Hero Returns

(*Special Akron Correspondence.*)

Lieut. George Hamm, a former Akron boy but recently in charge of a New York branch of the Goodrich, takes the loss of a leg in the recent fighting in France very philosophically.

"Things looked mighty black for me for a few days and I didn't care whether I lived or not, but thank God I picked up and now I am very glad I am living," he said. "I really am in luck. Out of 19 officers, only three are left, and the sixteen who are gone are all dead but myself and two other lieutenants. Our regiment got in awfully hard."

Lieut. Hamm was with the 101st infantry, 26th division.

Savage Promotes Chamberlain

L. S. Chamberlain, formerly manager of the San Diego, Cal., branch of the Savage Tire corporation, San Diego, Cal., has been promoted to the position of assistant sales manager, with headquarters at the factory. H. E. Kressler, until recently with The B. F. Goodrich Rubber Company, succeeds him as San Diego branch manager.

C. H. Greyer Again a Civilian

C. H. Greyer, who left the Philadelphia, Pa., branch of the Kelly-Springfield Tire Company, New York City, to enter the army, has returned to that company and will travel the northeastern section of Pennsylvania. He was a sergeant at the time he obtained his discharge from the service.

Miller Chemist to Visit Plantations

E. A. Warner, chief chemist of the Miller Rubber Company, Akron, Ohio, is now on his way to the Federated Malay States. It is understood that the object of his trip is to get into closer touch with crude rubber producers.

Yule Announces Retirement

William H. Yule, manager of Mechanical Sales for the B. F. Goodrich Rubber Company, Akron, Ohio, has announced his resignation, and will leave the rubber industry to manage his newly-purchased orange and fruit ranch near Santa Barbara, Cal.

Mr. Yule has been connected with the Goodrich Company for a number of years, working his way up from one managerial position to another, until in the past few years he has been recognized as one of the

WILLIAM H. YULE

big men of the Goodrich national organization.

Prior to assuming his duties as the head of Mechanical Sales in Akron, Yule was, for a number of years, manager of the Goodrich New York branch.

Wales Returns to Raybestos

Lieutenant E. A. Wales, formerly chief of production, Motors Division, Quartermaster's Corps, Cleveland, Ohio, has reentered the employ of the Raybestos Company, Bridgeport, Conn., where he will resume his pre-war duties as manager of its Detroit, Mich., branch at 1713 Dime National Bank Building.

New Goodyear Physical Director

Edward Connor, former athletic director at Lincoln High School, Akron, Ohio, is now with the Goodyear Tire and Rubber Company, that city, as physical director. Mr. Connor was athletic director at Camp Sherman during the war with the rank of Major.

Lee Sales Manager in Cuba

Harry E. Field, sales manager of the Lee Tire & Rubber Company, Conshohocken, Pa., and New York City, is sailing for Cuba where he will devote special attention to the development of his concern's tire business.

H. D. Reiff with Kelly-Springfield

H. D. Reiff, for more than eight years with the Fisk Rubber Company, Chicopee Falls, Mass., has joined the sales forces of the Kelly-Springfield Tire Company, New York City, at the Philadelphia, Pa., branch of that company.

American Rubber Patents

ISSUED MAY 27, 1919.

1,304,562—To John O. Hammell, Chicago, Ill. Steam-Trap.

1,304,563—To John O. Hammell, Chicago, Ill. Steam-Trap.

1,304,565—To Clark T. Henderson, Milwaukee, Wis., assignor to The Cutler-Hammer Mfg. Co., Milwaukee, Wis. Winding Mechanism.

1,304,576—To Henry P. Kraft, Ridgewood, N. J. Inflating-Coupling.

1,304,588—To James F. Monahan, Newark, N. J., assignor to Edison Storage Battery Company, West Orange, N. J. Tray for Battery-Cells.

1,304,603—To Charles G. Richardson, Springfield, Vt. Measuring-Machine.

1,304,653—To Robert Benjamin Booth, Honolulu, Hawaii, assignor of one half to John J. Armstrong, Honolulu, Hawaii. Hose-Coupling.

1,304,930—To Henry K. Austin, Reading, Mass. Tire-Inflating Pump.

1,305,101—To Albert W. Hayward, Cincinnati, Ohio, assignor to Dora S. Hayward, Cincinnati, Ohio. Tire-Protector Device.

1,305,196—To Albert L. Cole, Auburndale, Mass. Vehicle-Tire.

ISSUED JUNE 3, 1919.

1,305,247—To Charles James Beaver, Hale and Ernest Alexander Claremont, High Legh, England. Manufacture of Electric Cables.

1,305,263—To Chauncey B. Earnheart, Indianapolis, Ind., assignor to Safety-First Devices Company, Indianapolis, Ind. Pressure-Indicating Air-Valve.

1,305,264—To Chauncey B. Earnheart, Indianapolis, Ind., assignor to Safety-First Devices Company, Indianapolis, Ind. Valve for Pneumatic Tires.

1,305,265—To Chauncey B. Earnheart, Indianapolis, Ind., assignor to Safety First Devices Company, Indianapolis, Ind. Pressure-Indicating Valve.

1,305,315—To Albert L. Stahl, Memphis, Tenn. Tire-Deflating Indicator.

1,305,337—To Julius Bjornlie, Watertown, S. D., assignor of one-half to Thorwald Bjornlie, Madison, Minn. Tire-Tool.

1,305,377—To William H. Krug, Oshkosh, Wis. Anti-skid Device.

1,305,400—To Anthony Novy, Rapid City, S. D. Tire-Armor.

1,305,408—To James E. Rasor, Sherman, Tex. Vulcanizing Apparatus.

1,305,445—To Elias E. Davidson, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N. Y. Anti-friction Feed-Chute for Tube-Machines.

1,305,474—To George H. Lewis, Chicopee Falls, Mass., assignor to The Fisk Rubber Company, Chicopee Falls, Mass. Vulcanizer.

1,305,490—To Parker Petersen, Boston, Mass., assignor to Boston Machinery Company, Boston, Mass. Braiding-Machine.

1,305,552—To Henry P. Kraft, Ridgewood, N. J. Tire-Valve.

1,305,654—To Guy L. Lewis, Akron, Ohio. Device for Breaking, Contracting and Expanding Rims.

1,305,666—To Kenneth A. Palmer and John C. Irvin, New York, N. Y. Tube-Folding Machine.

1,305,682—To Robert W. Ashley, New York, N. Y., assignor of one-half to Frank Oberkirch, St. Marys, Pa. Vehicle-Wheel Rim.

1,305,683—To Robert W. Ashley, New York, N. Y., and Frank Oberkirch, St. Mary's, Pa. Demountable Rim for Wire Wheels and the Like.

1,305,737—To Charles G. Neiglick, Chicago, Ill. Hose-Band.

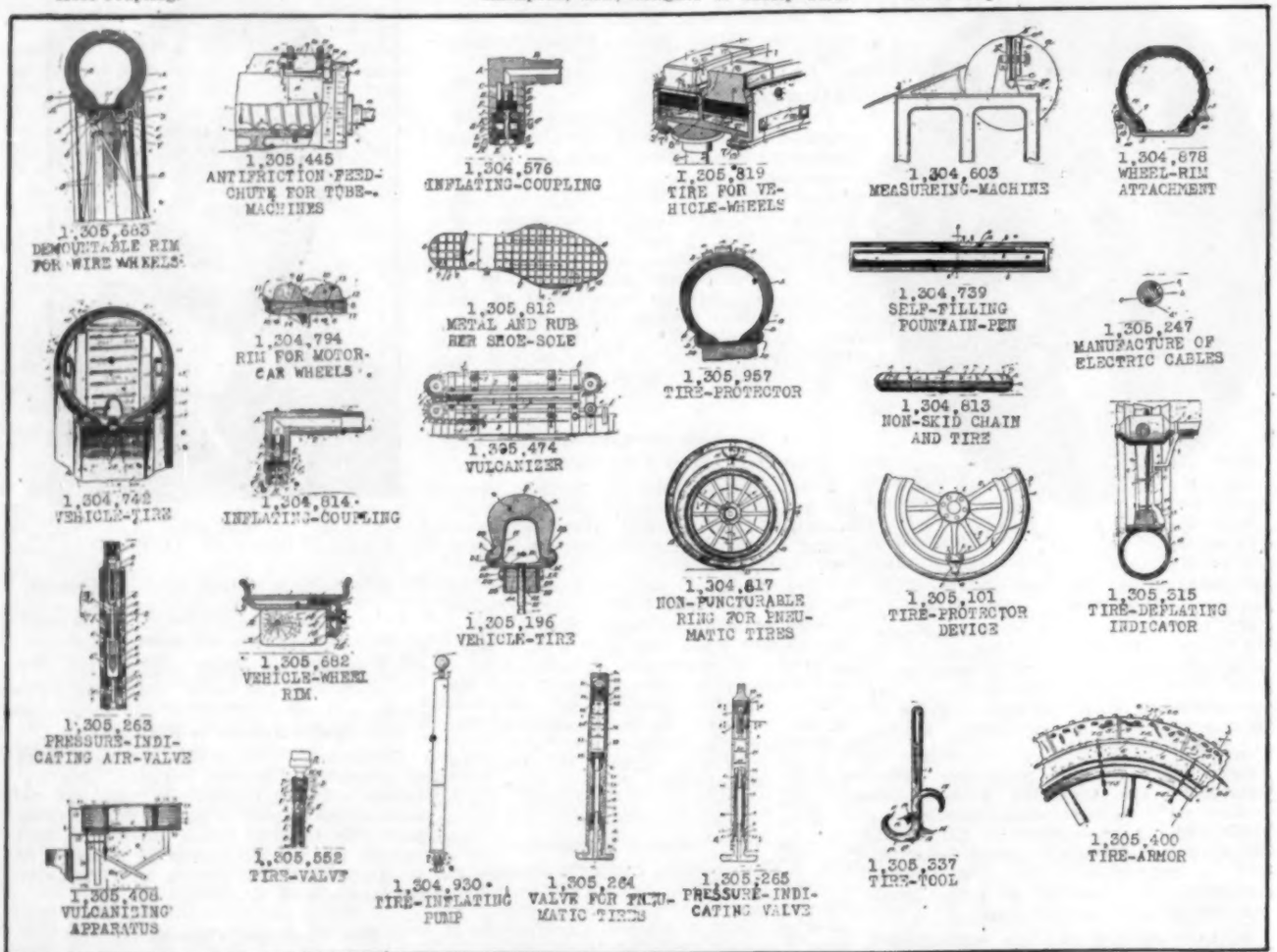
1,305,740—To John Overbeke, Cleveland, Ohio. Fabric Winding and Measuring Mechanism.

1,305,812—To Ernest E. Lambert, Attalla, Ala. Metal and Rubber Shoe-Sole.

1,305,819—To Robert G. McMullen, Portland, Oreg. Tire for Vehicle-Wheels.

1,305,820—To Colin Macbeth, Birmingham, England, assignor to the Dunlop Rubber Company, Limited, Westminster, London, England, Vehicle-Wheel.

1,305,867—To Max Atlas, Jacksonville, Fla. Crutch-Tip.



1,304,704—To Oscar H. Pieper & Alphonse F. Pieper, Rochester, N. Y. Pressure-Regulator.

1,304,729—To Louis Bendit, Chelsea, Okla. Method of Producing Lamp-black.

1,304,739—To Herbert L. Carman, New York, N. Y. Self-Filling Fountain Pen.

1,304,742—To Walter E. Cook, Cleveland, Ohio. Vehicle-Tire.

1,304,794—To Ralph L. Morgan, Worcester, Mass. Rim for Motor-Car Wheels.

1,304,801—To Cornelius P. O'Brien, Omaha, Nebr. Resilient Wheel-Tire.

1,304,813—To Charles E. Schneider, Chicago, Ill. Non-Skid Chain and Tire.

1,304,814—To Maximilian Charles Schweinert, West Hoboken, and Henry P. Kraft, Ridgewood, N. J. Inflating-Coupling.

1,304,817—To Frank J. Slifka, Chicago, Ill. Non-Puncturable Ring for Pneumatic Tires.

1,304,878—To Francis Hickman, Boundbrook, N. J., assignor of one-half to Bound Brook Oil-Less Bearing Company, Boundbrook, N. J. Wheel-Rim Attachment.

1,304,902—To Clarke P. Pond, Philadelphia, Pa. Floating Tire-Rack.

1,304,909—To Fred Thomas Roberts, Cleveland, Ohio, assignor of one-half to Ralph H. Rosenfeld, Cleveland, Ohio. Method of Vulcanizing Tires.

1,305,871—To Edward C. Bohlman, Excelsior, Minn. Variable-Speed Power Transmission.

1,305,957—To Agapito Afable, Manila, Philippine Islands. Tire-Protector.

Essenkay Opens in Indianapolis

The Essenkay Products Company, Chicago, Ill., will have its products sold in Indianapolis, Ind., by the Essenkay Sales Company of Indianapolis, a corporation that has been formed specially for that purpose. The new company is headed by T. R. Lewis, a local man, and J. B. Schroeder, lately of the Dayton Wire Wheel Company.

Farrel Removes Cleveland Office

The Farrel Foundry & Machine Company, Ansonia, Conn., a pioneer in the building of rubber machinery and one of the largest concerns in its field, has removed its Cleveland office to 802-3 Swetland Building, that city.

MARKETS

Manufactured Rubber Goods

NEW YORK, June 20, 1919.

With industrial conditions throughout the country picking up it is only natural that this change should be more or less reflected in the rubber goods manufacturing industry. Things are far from being normal, but while business in general is on the balancing point as the time for definite action on the peace treaty is in sight there is an undercurrent of optimism that is constantly becoming more audible.

Manufacturers of mechanicals, rubber drug sundries and tires all report improved conditions, with production at the factories being greater and the demand from the trade slightly larger. Tire manufacturers continue to be the most active though considerable of their efforts are being turned to the making of stock in anticipation of a heavy future demand. Retailers in all branches of the industry report that their stocks are moving slowly. But in most cases they hold a roseate view of the future.

MECHANICALS

During the last week manufacturers of belting, packing and other mechanical lines received more orders than in any week for some time past. Continued purchases of conveyor belting by sand and gravel companies were reported. Construction concerns also are placing orders more freely.

Manufacturers with representatives in the copper mining districts have received reports to the effect that production has been greatly curtailed at the mines and that it is likely new equipment will be bought by the operating companies for some months. Concerns handling rubber equipment for railroads believe that with the signing by President Wilson of the $750,000,000 railroad deficiency bill they will receive orders for new equipment. It is the general impression that the railroads are carrying unusually low stocks of replacement equipment and that when the buying does start it will be for quantities that will start the mechanical factories on an extended busy period.

In commenting on the railroad situation as it affects the rubber industry, the New York representative for a company said to be one of the leaders in the railroad equipment line declared yesterday that the individual roads were carrying much lower stocks than they wanted to. For some time, he said, the roads were selling their surplus stocks to each other, but now there is no such thing as surplus stock. Supplies have reached the stage where further depletion by some lines would result in their finding themselves in a serious position, he stated. The sales manager believes that when buying by the railroads starts it will represent a large buying campaign. Throughout the mechanical rubber industry the feeling is strong that the railroads will be turned back to their owners by the government before the first of August under conditions similar to those which govern the present operation of the telegraph lines.

TIRES

There continues to be a depression in the selling of tires in certain sections of the country, particularly the East. Dealers are reported to be carrying large stocks which are moving with exceptional slowness. In the trade the big question is will any price cut come next month? In certain trade circles the impression is pretty firmly rooted that new price lists will be announced by the middle of July. Other dealers declare they have abandoned the idea that another cut would be made by the tire manufacturers. The extended mileage guarantee by some companies is said to have created the desired effect in that motorists are commencing to display a preference for the casing carrying the largest mileage.

Manufacturers are working their plants to full capacity and are reported to have large stocks held in reserve for a demand anticipated for late this summer. Automobile production, it is frankly admitted by the car makers, will not come up to the mark established in 1917, but the industry is now swinging along at a pace that would have brought a new record production for the year had it been possible to start the year with all the wartime restrictions removed. When the armistice was signed the automobile manufacturing industry was practically on a 100 per cent war basis. It was not until February that a turn to anything like a peace-time production was possible. Since then cars have been turned out in ever-increasing numbers, with dealers throughout the country pressing the factories for deliveries. In New York representatives of the more popular makes of cars are in a position to book orders only with the understanding that deliveries will not be made until August or later. This condition naturally reflects upon the tire business.

DRUG SUNDRIES

Because retailers have been carrying small stocks in anticipation of lower prices, manufacturers of druggists' sundries are doing a business that is considered unusual for this time of the year. Usually the retailers buy sufficient stocks in the fall to carry them over the summer months and then come back into the market with new orders during the latter part of July and August. This year they are constantly placing additional orders to keep up with the current wants of their customers.

Selling agents for manufacturers state that they are now doing more unsolicited mail-order business than they formerly obtained through the efforts of their traveling salesmen. While orders cover only small quantities of goods they are being received with encouraging regularity.

Cotton, Yarns and Fabrics

NEW YORK, June 20, 1919.

The cotton market has been in a generally unsettled condition since our last report, but the undertone of the market has retained its firm appearance, and sentiment is still bullish. The market may best be described as having a tendency to readjustment after the unusually violent fluctuations of the past month. The reaction has not been confined alone to the local market, various recessions being reported from the more important spot markets in the South. As illustrating the inherently strong undertone to the market, however, it is pointed out that comparatively little stock has been offered on any of these declines, holders preferring to retain their stocks until later on, when the sold-up condition of the crop may yield them a larger return.

There have been no changes in crop prospects since the report of the Government, noted in our last report, but the market has fluctuated irregularly from time to time. October contracts, which sold at 32.20 during the height of the bull movement late in May selling down to 27.53, and subsequently recovering to 31.30. The weekly report of the Weather Bureau for the past week indicates that the crop has shown a little improvement, but the improvement thus far is said to be unimportant. Should the weather continue fair this month, some considerable improvement is looked for in some districts, but on the other hand, many factors are predicting serious deterioration during the summer months. The mild winter and the wet weather during the early spring months are ideal conditions for the propagation and spread of the boll weevil, and damage from this pest is expected to be more noticeable this season than last.

This condition, as well as the general indication of a short crop this year, lends a bullish sentiment to the market. This sentiment is further intensified by the known shortage of cotton abroad, and the steadily expanding export demand. Moderate buying from the Scandinavian countries has been reported during the past week, and Holland has also made several large purchases in the American market. A shipment for the new republic of Czecho-Slovakia has been reported, via Hamburg, and the demand from the Central Powers and Turkey is expected to be large when the final treaty of peace is signed. England has been a fair purchaser in the American market, reducing the freight rates on British ships from Savannah to Liverpool from $2.20 to $1.50 per hundred, the same as the American rate, established by the United States Shipping Board. South American demand continues fair, and some business with the Orient is also reported. Trade demand is becoming stronger as the market

for cotton fabrics shows more improvement.

SEA ISLAND COTTON

The market for Sea Island cotton remains quiet. There is a fair jobbing business in old crop stock, when growers having any holdings are located who are willing to sell at the figures offered. The sentiment among the growers is said to be still strongly in favor of cutting down their acreage for the next crop, and substituting crops of foodstuffs, which are less liable to damage by the boll weevil pest, which so worked against the growers last season. The growers point out that in many cases a good part of their crop is lost as the result of the depradations of insects and when their crop is finally gathered, they have a hard job of it to dispose of their holdings at what they deem fair prices, which, they argue, must be liberal enough to pay their growing costs, which are greatly increased by the losses sustained from insect damage.

EGYPTIAN COTTON

Reports received from Alexandria report that the new Egyptian cotton crop is starting favorably, with the acreage larger than that of last year. Water for present irrigation is said to be fairly plentiful, but a shortage is looked for during the summer months due to the releasing of huge reserves from the dams into the river to keep British army boats moving. The revolutionary disorders are said to have had little effect on the planting of the new crop, the Egyptians apparently working first and fighting afterwards. However, the British Government has applied a "leak proof" censorship on outgoing news, and little authentic information has come out. The disposal of the old crop is still being carried out under the control of the Cotton Control Commission, and no alterations in prices or selling conditions have been noted thus far.

FABRICS

Labor troubles in the textile industry are fairly settled thus far, and the much heralded threat of the "Bolshevists" to take over the industry remains a gust of hot air. The mills are increasing production to take care of the increased demand for practically all kinds of fabrics, and the labor problem is being well met by the employment of many returning fighters from overseas. With the markets of the world waiting for the final signing of the treaty of peace, the outlook in the fabrics industry was never more favorable, and continued strong demand, with high prices, is looked for. Export demand is fairly keen at the present time, and this phase of the situation is expected to develop within the near futures.

TIRE FABRICS

There is a fairly active demand for tire fabrics reported, and the market is showing a firm tone. Prices continue nominally unchanged. Dealers report that tire manufacturers are buying in fair volume at the present time, the demand from motorists being heavy, as is usual at this time of the year when the motoring and touring season is at its height.

HOSE AND BELTING FABRICS

There is a fair demand reported for hose and belting fabrics at the present time, although the market is still far from normal. Domestic demand is not large at the present time, but there is some business being put through for the export trade. Export demand for belting is particularly active, although most of the orders seem to call for leather belting. Many manufacturers are now resuming the making of specialties, discontinued under Government orders during the war, and are thus utilizing much of their producing facilities which would otherwise remain idle in the present market.

DRILLS, SHEETINGS AND OSNABURGS

While the market for drills and sheetings has been somewhat unsettled during the past fortnight, the tendency, on the whole, has been upwards, and the market continues to gain strength from week to week. Demand is on the increase, both the domestic and export trades placing heavier orders in the local market. The export buying has been fairly active for goods for shipment to South America, the Netherlands, the Scandinavian countries, France, and Great Britain. A good demand from Germany is also looked for when the treaty of peace is signed, and the new countries, such as Czecho-Slovakia, Poland, and Lithuania are also looked upon as prospective purchasers when conditions become more stable. Much of the trading during the past two weeks has been done by second hands, first hands being reluctant to sell much at present prices, expecting a stronger market within a short time. Demand for osnaburgs continues fair along jobbing lines.

BURLAPS

The market for burlaps has been firmly held since our last report, and spot holdings are steadily dwindling. Lightweight stock is extremely scarce in the domestic markets, and there is little stock on the way. Importers are not quoting the 7-ounce weight material as none is available and the 7½ ounce and 8 ounce materials are also lightly held. The present market is in strong contrast to that of a few months ago, when importers could not dispose of any of their stocks at any prices, and were forced to see their stocks piling up as shipments continued to pour in. In view of the scarcity of shipping between this port and India, the tonnage for burlaps must be contracted for months ahead of time, and with the market lifeless a few months ago, importers did not book any tonnage ahead. This has caused the present shortage.

TIRE FABRICS

17¼-ounce Sea Island, combed,	sq. yd.	1.40@1.55
17¼-ounce Egyptian, combed		1.20@1.30
17¼-ounce Egyptian, carded		Nominal
17¼-ounce Peelers, carded		.85@ .90
17¼-ounce Peelers, combed		1.05@1.15

DUCKS

Single Filling (pound basis)	lb.	Nominal
Double Filling (pound basis)		Nominal

DRILLS

37-inch	2.35-yard	yd.	@	
37-inch	2.75-yard		.24½@	
37-inch	3.00-yard		.23 @	
37-inch	3.25-yard		.21 @	
37-inch	3.50-yard		.20 @	
37-inch	3.95-yard		.18½@	
37-inch	2.00-yard Southern		@	
37-inch	2.00-yard Northern		@	
40-inch	2.40-yard Southern		@	
40-inch	2.40-yard Northern		@	
52-inch	1.90-yard Southern		@	
52-inch	1.90-yard Northern		@	

SHEETINGS

40-inch	2.35-yard	yd. .23	@	.23½
40-inch	2.50-yard	2.50	@	
40-inch	2.85-yard	.21	@	
40-inch	3.00-yard	.20	@	.20½
40-inch	3.25-yard	.19	@	.19½
40-inch	3.75-yard	.17½	@	
40-inch	3.60-yard	.18	@	
40-inch	4.25-yard	.16	@	

Note.—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload lots)

			Per Yard
7	-ounce	40-inch	Nominal
7½	-ounce	40-inch	10.50@
7½	-ounce	45-inch	Nominal
8	-ounce	36-inch	10.50@
8	-ounce	40-inch	10.65@ 10.75
8½	-ounce	40-inch*	@
10	-ounce	36-inch	@
10	-ounce	40-inch	11.75@ 11.85
10	-ounce	45-inch	Nominal
10½	-ounce	40-inch	12.00@ 12.10

* Nominal.

Chemicals and Compounding Materials

NEW YORK, June 20, 1919.

Increasing firmness has marked the market for chemicals and compounding materials during the past fortnight, and the market at the present time is in a stronger condition than for some months past. The rapid advances in the prices of oils and turpentines have occupied the centre of attention during the past two weeks, these prices going higher almost every day. Consumers are buying more freely in all lines, dealers reporting that the demand is improving in practically every branch of the industry, with the outlook still more favorable for better conditions later on. Many consumers have found out to their sorrow that they have "overstayed" the market, that is, they have remained out of the market too long in the hope of getting lower prices. These manufacturers now find themselves compelled to pay more than they would a short time ago, while others of a more optimistic and far-seeing disposition are now getting deliveries on materials contracted for last month and the previous month at much lower levels.

Although demand is not up to normal yet in any lines, the important feature of the market is the fact that the demand is constantly improving, and the volume of business during May was appreciable greater than during the same month last year. The call for dry colors and leads is improving right along, and the markets are being firmly maintained. Leads in oil have not yet been advanced in sympathy with the advances in oil prices, but such an advance is believed certain within the next few weeks should oil prices continue soaring as they now are. Lithopone and zinc oxide manufacturers find themselves rushed to fill the business offered them. Barytes producers also state that they are unable to fully care for the large volume of business offered.

EXPORTS

The volume of exports is steadily on the increase, according to reports gathered from leading producers and dealers. The scope of this branch of the market is expected to be greatly enlarged within a short time when the markets of the world are thrown open to trade and commerce by the signing of the treaty of peace. At present, the amount of export business is being greatly hampered by the need of all available tonnage for the transportation of more needed commodities, such as food, cotton, and supplies for our army yet overseas. In addition, much of the mercantile tonnage is still in the transport service, bringing our troops back from France, and all these factors combine to reduce the export trade. The outlook is very promising, however, and there is a fair amount of business with South America being booked. In addition, the Scandinavian countries are making large purchases, especially of oils, and several large consignments have gone forward to the Netherlands. It is believed that the latter market is absorbing American products of this sort to sell to the Central Powers. France and England have also been operating in a fairly large manner in the market.

LITHARGE

The market has shown considerable improvement since our last report, and although trading is not yet as active as producers would like to see it, the amount of business being booked is fairly satisfactory to them, and the outlook for increased business is very promising. Prices remain unchanged, with the market held at 9¾ to 10½ cents per pound for American powdered.

WHITING

The market for whiting has been rather quiet during the past two weeks, and prices have remained unchanged since the decline announced two weeks ago, as the result of heavy imports. Demand is fair at the present time, and dealers report that the volume of inquiries is steadily increasing. The volume of imports is not overly-large, shipments continuing just sufficient to fill the needs of manufacturers.

ZINC OXIDE

Demand for zinc oxide is reported as strong in all sections of the trade, the automobile industry again being mentioned as one of the largest factors in the market. Demand continues to keep pace with production, and the volume of inquiries is constantly increasing. Prices remain unchanged for the present, although a revision for the third quarter of the year is looked for around the first of July.

Prices Current for Chemicals, Fillers, Colors, etc.

Acetone, in drums	lb.	.15½ @	—
Accelerator, in drums	lb.	.85 @	1.00
Acids, Acetic, 56%	cwt.	6.00 @	6.50
Carbolic, C. P.	lb.	.15 @	.18
*Cresylic, C. P.	lb.	1.10 @	1.15
Muriatic, 20 deg.	lb.	1.20 @	1.40
Muriatic, 22 deg.	cwt.	1.40 @	1.60
Nitric, 42 deg.	cwt.	8.00 @	8.50
Nitric, 40 deg.	cwt.	7.50 @	7.75
Sulphuric, 60 deg.	ton	12.00 @	15.00
Tartaric, crystals	lb.	.86½ @	—
Aluminum Flake	ton	29.00 @	31.00
Aniline oil, bulk basis, domestic		.24 @	.25
Imported		Nominal	
Antimony, metal spot	lb.	8.50 @	—
Oxide	lb.	.08½ @	.12
Sulphuret, red	lb.	.20 @	.21
Sulphuret, golden	lb.	.21 @	.22
Sulphuret, crimson	lb.	.35 @	.40
Asbestos	ton	35.00 @	45.00
Asphaltum, Egyptian	lb.	.20 @	.30
Domestic	ton	22.00 @	30.00
Barium sulphate, technical	lb.	.04½ @	.05
Sulphide	lb.	07¼ @	.07½
Barytes, prime white imported	ton	Nominal	
white, domestic	lb.	.30 @	.31
off color, domestic	lb.	.21 @	.24
Southern, f.o.b. mills		21.00 @	—
Western, f.o.b. mills		21.50 @	—
Benzol, pure, bulk	gal.	.22 @	.27
Beta-naphtol, sublimed	lb.	.55 @	.65
unsublimed	lb.	.50 @	.52
Blacks, Drop	lb.	.05½ @	.15
Ivory	lb.	.16 @	.30
Carbon, gas, cases	lb.	.12 @	.25
Lampblack, R. M.	lb.	.15 @	.45
Mineral blacks	ton	35.00 @	45.00
Blues, Prussian	lb.	.70 @	.80
Soluble	lb.	.75 @	.85
Ultramarine	lb.	.12 @	.40
Browns, Umber, Turkey, burnt, powdered	lb.	.05 @	.06½
American, burnt	lb.	.02½ @	.04
Cadmium sulphide, yellow	lb.	2.00 @	2.25
Carbon, disulphide, bulk	lb.	.07 @	.07½
tetrachloride drums	lb.	.13½ @	.14
Caustic Soda, 76@78%	cwt.	2.65 @	3.00
Chalk, precipitated, extra light	lb.	.05½ @	.06½
light	lb.	.05 @	.06
heavy	lb.	.05½ @	.06
China clay, domestic	ton	8.50 @	15.00
imported	ton	18.00 @	23.50
Fossil flour	lb.	.03¾ @	.05
Gilsonite	ton	47.50 @	60.00
Glue, extra white	lb.	.35 @	.40
medium	lb.	.30 @	.35
low grade		.20 @	.25
Glycerine, C. P. (drums)	lb.	.21 @	—
cans		.23 @	—
Graphite, flake (bbl.)	lb.	.18 @	.20
powdered (bbl.)	lb.	.13 @	.15
Green, chrome, R. M.	lb.	.35 @	.40
Ground glass (fine)	lb.	.03½ @	.04
Hexamethylene	lb.	1.00 @	1.20
Infusorial earth, powd'd.	lb.	.02 @	.035
bolted	lb.	.035 @	—
Iron oxide, red, reduced grades	lb.	.07 @	.08
red, pure, bright	lb.	.15 @	.20
Lead, red, dry (casks)	lb.	.10¼ @	.10½
sublimed	lb.	.09¼ @	.09¾
white, basic carb.	lb.	.09 @	.09½
white, basic sulp.	lb.	.08¼ @	.08½
Lime flour	lb.	.01¾ @	.02
Litharge (casks)	lb.	.09¾ @	.10½
English	lb.	*.12 @	.13
Lithopone, domestic, bbls.	lb.	.06½ @	—
in bags		.06¾ @	—
Magnesia, carbonate	lb.	.12½ @	.13½
calcined, heavy	lb.	.12 @	.14
calcined light	lb.	.65 @	.75
Magnesite, calcined, pwd.	ton	65.00 @	—
Mica, powdered	lb.	.04¾ @	.05
Mineral rubber (asphaltum base)	ton	80.00 @	115.00
Naphtha, motor gasoline, (steel bbls.)	gal.	.23½ @	—
68 @ 70 degrees (steel bbls.)	gal.	.30½ @	—
70 @ 72 degrees (steel bbls.)	gal.	.31½ @	—
73 @ 76 degrees (steel bbls.)	gal.	.33½ @	—
machine (wood bbls.)	gal.	.36½ @	—
Oil corn, crude	lb.	.20 @	—
corn, refined	lb.	.24 @	—
linseed (bbls.)		1.88 @	1.91
in carloads		1.85 @	1.88
tank cars		1.81 @	1.84
Oil palm, Lagos	lb.	Nominal	
pine, yellow	gal.	.67 @	.69
rapeseed, refined	gal.	1.50 @	1.55
rapeseed, blown	gal.	1.58 @	1.60
rosin, first rectified	gal.	.87½ @	—
second run		.84½ @	—
tar (commercial)	gal.	.35 @	.36
Orange mineral, American	lb.	.13¼ @	.14¼
imported	lb.	.15 @	.20
Paraphenylenediamine	lb.	3.25 @	4.00
Petrolatum, bbls., amber	lb.	.07½ @	.08
pale yellow	lb.	.06 @	.07
Pine tar kiln	bbl.	12.00 @	12.50
Pitch	bbl.	8.25 @	—
Plaster of paris	bbl.	2.00 @	3.00
Red Tuscan	lb.	.22 @	.30
Indian (reduced)	lb.	.14 @	.16
Standard	lb.	.12 @	.16
Rosin (common to good) 280 lbs.	bbl.	11.45 @	—
Rotten stone, powdered	lb.	.02½ @	.04½
Rubber, substitute, black	lb.	.13 @	.17
white	lb.	.15 @	.24
brown	lb.	.20 @	.25
Shellac, fine orange		— @	—
T. N.	lb.	— @	—
Bleached ordinary	lb.	— @	—
Bleached bonedry	lb.	— @	—
Silex (silica)	ton	22.00 @	40.00
Soapstone, powdered	ton	12.00 @	17.50
Starch, corn, powdered	lb.	5.52 @	5.74
pearl		5.37 @	5.59
Sulphur, crude	ton	*50.00 @	—
100 pounds		3.20 @	4.25
roll		2.70 @	3.15
commercial superfine		2.50 @	—
Talc, American	ton	20.00 @	40.00
French	ton	*30.00 @	35.00
Toluol, pure, in drums	gal.	.22 @	.27
Tripolite earth	ton	60.00 @	70.00
Turpentine, pure gum—spirits	gal.	1.15 @	—
wood	gal.	.95 @	.80
Venice, artificial	gal.	.13 @	.13½
Vermilion, English	lb.	1.30 @	—
Wax, beeswax, crude yel.	lb.	.39 @	.41
ceresin, white	lb.	.18 @	.25
carnauba, No. 3	lb.	.45 @	.46
Montan, crude	lb.	.35 @	.36
ozokerite, black	lb.	*.60 @	.61
ozokerite, green	lb.	Nominal	
Wax, Paraffin, refined, 118/120 M. P. (bbls.)	lb.	.08¼ @	.08½
Paraffin, 125/127 M. P.	lb.	.08½ @	.08¾
Wax, Paraffin, 128/130 M. P.	lb.	.09 @	.09¼
133/135 M.P.	lb.	.10¾ @	.11
Crude, 120/122 M.P.	lb.	.10¾ @	—
124/126 M.P.	lb.	.10½ @	.10¾
Whiting, commercial	cwt.	1.15 @	1.20
Alba	cwt.	1.25 @	—
Paris, white, American	cwt.	1.50 @	—
English cliffstone	cwt.	1.75 @	2.50
Yellow chrome	lb.	.24 @	.25
†Zinc oxide, States Brand.		.10 @	—
horsehead brand	lb.	†.10 @	.10¼
selected	lb.	†.09½ @	—
"XX red"	lb.	†.09 @	—
French process, green seal	lb.	†.10½ @	—
red seal	lb.	†.09¾ @	—
white seal	lb.	†.11½ @	—
substitutes	ton	35.00 @	40.00
sulphate, pure	lb.	*.04 @	.04¼

* Nominal. † Contract prices.

Crude Rubber

NEW YORK, June 20, 1919.

Several sharp price breaks have occured in the local rubber market during the past fortnight, and prices are generally quoted considerably lower throughout the entire list. The heavy accumulations of stock, constantly piling up in the local market, are acting as a detriment to trade, and keep the market in an easy position. Manufacturers appear well supplied with rubber enough to cover their current consuming requirements, and are supplied far enough ahead to enable them to keep out of the present market. Present spot values are said to be almost as low as the cost of importation, importers being forced to lower their prices to cost in order to move their stocks, but despite this fact holders appear unable to interest consumers in any offerings.

Para Up-river coarse is quoted ½ cent per pound lower at 33½ and 34 cents, while Coucho ball is 1 to 1½ cent lower at 33½ and 34 cents. Cameta is quoted ½ to 1 cent lower at 22½ cents. Ceylon, smoked sheets ribbed are 8 cents down at 40 cents, while smoked sheets plain are 8 cents lower at 39 cents per pound. The market for first latex pale crepe has shown the same decrease, the market being held at 41 cents. Amber crepe and clean brown crepe are nominal. Corinto prime is 1 cent lower at 34 cents per pound, Esmeralda is 1 cent down at .34 cents, and Guayule, wet, has shown a decline of 5 cents, being quoted at 25 cents per pound. Balata block Panama is slightly firmer at 57 cents in some quarters, while Balata sheets are nominally held.

	Cents per pound.
Para—Up-river fine	56 @ ....
Up-river medium	52 @ ....
Up-river coarse	33½ @ 34
Caucho ball	33½ @ 34
Islands fine	48 @ ....
Islands coarse	21½ @ ....
Cameta	22½ @ ....
Madeira fine	62 @ ....
Knapsack	73 @ ....
Ceylons—Smoked sheets, ribbed	40 @ ....
Smoked sheets, plain	39 @ ....
First latex pale crepe	41 @ ....
Amber crepe	Nominal.
Clean brown crepe	54 @ ....
Centrals—Corinto prime	34 @ ....
Esmeralda, prime	34 @ ....
Mexican scrap	25 @ ....
Balata sheets	57 @ ....

Scrap Rubber

NEW YORK, June 20, 1919.

Continued lack of demand for their product has caused several rubber reclaimers to convert their plants to the manufacture of rubber goods. At the quarterly meeting of the reclaimers' association this week it was stated that others were seriously considering taking similar steps.

Scrap dealers, who are reported to have large stocks on hand, are finding a good source for revenue in the sale of old tires to concerns spcializing in retreading processes.

The following are averages of dealers' sales prices in New York:

Boots and shoes	6.50 @ 6.75
Arctics, trimmed	4.75 @ 5.00
Arctics, untrimmed	3.75 @ 4.25
Tires—Automobile	3.25 @ 4.00
Bicycles, pneumatic	3.00 @ 3.25
Mixed hose	1.25 @ 1.50
Air brake	3.75 @ 4.00
Inner tubes, No. 1	17.00 @ 18.00
Inner tubes, No. 2	8.00 @ 9.00

Accelerators

THE use of organic accelerators is no longer a matter of guesswork. It is highly scientific.

As the largest American producers of Aniline Oil and Intermediates, we offer you full co-operation and service. Our laboratories stand ready to assist you in any chemical problem that may arise.

National Aniline & Chemical Company

INCORPORATED

New York: 21 Burling Slip

Akron, Ohio: People's Savings & Trust Building

Chemicals for the Rubber Trade

States Brand — "MADE IN AMERICA" — APPROX. 17% FREE COLLOIDAL SULPHUR

STATES BRAND
RED SULPHURET
of
ANTIMONY

Use States Brand Sulphuret of Antimony
and
Thistle Brand Heavy Calcined Magnesia
to produce the best rubber products.

The excellent results obtained from these materials encourage their use in every branch of the rubber manufacture.

produce tubes with utmost heat resisting qualities, long life and numerous selling points

CO-OPERATION and SERVICE have placed Frazar & Co. in the enviable position of being always "A Step in Advance."

SCOTLAND — THISTLE — BRAND. — TRADE MARK

THISTLE BRAND
HEAVY and
MANHATTAN BRAND
LIGHT CALCINED
MAGNESIA

We have an intimate knowledge of our PRODUCTS and their FUNCTIONS.

OUR LABORATORY IS CONDUCTED SOLELY FOR THE SERVICE OF THE RUBBER TRADE at LARGE.

WE ARE INTERESTED IN YOUR PROBLEMS and desire to co-operate.

FRAZAR & COMPANY

30 CHURCH STREET — Established 1856 — NEW YORK

REPRESENTED BY

J. A. KENDALL, Second National Building, AKRON, OHIO
THE H. R. SANDER COMPANY, 131 Leidesdorff Street, SAN FRANCISCO, CAL.
FRED L. MOSES, 220 Devonshire Street, BOSTON, MASSACHUSETTS
EDWARD B. FULPER, 713-5 American Mechanic Building, TRENTON, N. J.
R. NORTHCOTE & COMPANY, Canadian Pacific Building, TORONTO, ONTARIO

Emergency stocks carried at above points